

From: [Becker, Scott A](#)
To: [Odell - DNR, Eric](#)
Subject: Re: [EXTERNAL] Idaho and big game
Date: Monday, June 6, 2022 12:10:30 PM
Attachments: [IDFG_policy-avian-mamm-predation-mgmt_2000.pdf](#)
[planLoloSelwayPredation.pdf](#)
[planMiddleForkPredation.pdf](#)
[planPanhandlePredation.pdf](#)
[planSawtoothPredation.pdf](#)
[predationMgmtBrochure.pdf](#)
[F4WM_Reimbursement Process ID-MT_2021-2022_season.pdf](#)

This is from p. 69800 in the 2020 rule (the final sentence was added from the status review.

'Under the IDFG Policy for Avian and Mammalian Predator Management (IDFG 2000), where there is evidence that predation is a significant factor inhibiting prey populations from achieving management objectives, management actions to mitigate the effects of predators may be developed in a predation management plan. Initial management options may include habitat improvements, changes to regulations governing take of the affected species, or regulatory changes that increase hunter/trapper opportunity for predators. If these methods are implemented and do not achieve the desired management objective, predator management may be used to reduce predator populations where predator effects are most significant. To date, predator management plans have been developed for five elk management zones in Idaho with wolves being one of, if not the primary, targeted predator (IDFG 2011, IDFG 2014a, IDFG 2014b, IDFG 2014c). Between 2011 and 2021, 157 wolves have been removed under these predation management plans to benefit ungulate populations.'

I thought about sending a few paragraphs from our status review, but decided against it since it is still draft. I attached some info from the F4WM website that discusses increased payments and where those occurred during the 2021-2022 season. I've also attached all known predation mgmt plans and their policy for avian-mammalian pred mgmt. Sorry it is not condensed but I have to run now and be available for a meeting thsi afternoon between 2-4. Be happy to chat over phone anytime this week about this, if need be. Hope things went well for you and the family last week!!

scott

Scott Becker
Regional Wolf Coordinator
USFWS
170 North 1st St
Lander, WY 82520

Phone: 307-399-8445

COVID-19 UPDATES & CHANGES

Review our COVID-19 page for up-to-date information on closures, restrictions, and changes.

[Learn more...](#)

Policy for Avian and Mammalian Predation Management

Adopted August 24, 2000

I. PURPOSE

The Idaho Department of Fish and Game (Department) has a responsibility to preserve, protect, perpetuate and manage all wildlife in the state and to provide continued supplies of such wildlife for hunting, fishing and trapping. To fulfill its responsibility, the Department must efficiently and effectively manage populations of predators as well as populations of prey species to meet management objectives. The Department recognizes predator management to be a viable and legitimate wildlife management tool that must be available to wildlife managers when needed. However, the Department also recognizes that predator removal is controversial both publicly and professionally. The purpose of this policy is to provide the Department direction in managing predator populations consistent with meeting management objectives for prey species populations.

This policy does not apply to emergency response situations where the Department must act to protect human health and safety.

II. DEFINITIONS

- A. **“Predation”** means the act of an individual animal killing another live animal.
- B. **“Predator”** means any wild animal species subsisting, wholly or in part, on other living animals captured through its own efforts. Predators are defined in Idaho Code as 'big game animals' (black bear and mountain lion), 'migratory birds' (American crow), 'fur-bearing animals' (badger, bobcat, fisher, marten, mink, otter, raccoon, and red fox), and 'predatory wildlife' (coyote, skunk, and weasel). For the purpose of this policy, "predator" will include primarily those avian and terrestrial species subject to Idaho jurisdiction, but may in some cases include species which are protected under the Migratory Bird Treaty Act or the Endangered Species Act. For predatory species protected under these or other federal statutes, the Department may cooperate with the USDA Animal and Plant Health Inspection Service and/or the U.S. Fish and Wildlife Service in addressing predation problems caused by such species.

- C. **"Predation management"** means the application of professional wildlife management technology to increase or decrease predator populations. Predator management may include management of habitats to benefit or depress populations, selective harvest of individual animals, or generalized harvest over a geographic area.
- D. **"Predator removal"** means the physical removal of an animal, alive or dead, from an area where its presence is undesirable. Physical removal of live animals for release in habitats already occupied by the same species has been shown to create additional problems as individual animals seek living space (i.e., a home range) within already-occupied suitable habitat; for that reason, predator removal will often but not necessarily require lethal methods.
- E. **"Prey"** means any animal hunted or killed as food by a predator.

III. POLICY

Predator populations, as with all wildlife in Idaho, will be managed to assure their future recreational, ecological, intrinsic, scientific, and educational values, and to limit conflicts with human enterprise and values. Where there is evidence that predation is a significant factor inhibiting the ability of a prey species to attain Department population management objectives and the Department decides to implement predation management actions, the management actions will ordinarily be directed by a predation management plan.

Predator populations will be managed through habitat manipulation and/or predator removal as appropriate. Wildlife managers and administrators implementing predation management options will consider the ecological relationships that will be affected. Management decisions will be consistent with objectives or management plans for predators, animals that constitute or contribute to the predator's prey base, affected habitat, and other biological and social constraints.

Idaho Code provides that predatory wildlife (i.e., coyotes, jack rabbits, skunks, starlings, and weasels) may be taken by any legal means at any time.

On lands managed by the Department, efforts to limit the size of predator populations may include habitat manipulation. The Department may encourage other land management agencies to manipulate habitat under their jurisdiction in a manner to limit the size or effectiveness of predator populations.

The Department, when and where feasible, will rely on sportsmen (licensed hunters and trappers) to take predators classified as game animals and fur-bearing animals, and may alter seasons or harvest rules to meet wildlife management objectives. However, the Department will not support any contests or similar activities involving the taking of predators which may portray hunting in an unethical fashion, devalue the predator, and which may be offensive to the general public. The Department opposes use of bounties as a predator control measure. The Department will not implement a program based, in whole or in part, on utilizing methods involving sterilization or birth control in wild animals.

The Department will cooperate with the Animal and Plant Health Inspection Service (APHIS) Wildlife Services Program to address specific areas and species, particularly on private lands, in a manner consistent with the approved interagency Memorandum of Understanding.

The Director may implement a Predation Management Plan in those circumstances where wildlife management objectives for prey species cannot be accomplished within two years by habitat manipulation, sportsman harvest, or interagency action designed to benefit the prey species, and where there is evidence that action affecting predators may aid in meeting management objectives. Essential components of such a Predation Management Plan are defined below.

This policy does not affect existing predator management policies and procedures used to administer livestock depredation issues.

IV. PROCEDURES

Managers recognize the role of predators in an ecological and conservation context. Impacts of the removal of individual predators on the structure of the predator population, as well as the prey population, will be considered. The actions by the Department must be based on the best available scientific information, and will be evaluated in terms of risk management to all affected wildlife species and habitats.

Valid concerns for human health and safety exist. Predator management will consider the need to avoid risk of human injury, loss of life, or potential for disease transmission.

Predator management may occur but is not limited to the following circumstances:

1. In localized areas where prey populations are fragmented or isolated, or where introductions or transplants of potentially vulnerable wildlife species (e.g., bighorn sheep, wild turkeys, sharp-tailed grouse, and others) has occurred or is imminent. Control may be intensive and of sufficient duration to allow transplanted animals and their progeny to become established and to become self-sustaining, or selective with removal efforts directed at specific offending animals.
2. In specific areas where managers are unable to meet management goals and objectives for prey populations due to predation. For example, in areas where survival or recruitment of game animal populations is chronically low and management plan objectives have not been or cannot be met and where there is evidence that predation is a significant factor, predator control may be initiated.
3. On wildlife management areas, especially those which are managed primarily to provide for production of specific species (e.g., waterfowl), provision of critical winter range, and those acquired and managed to provide specific mitigation for wildlife losses elsewhere.

Predation Management Plans will consider options other than just predator removal. Various kinds of habitat manipulation can sometimes negate or minimize the effect of predators, including constructing nesting islands, providing cover plantings, or removal of roosts used by avian predators. Preventative actions are important in reducing conflicts with predators; therefore, the Department will seek ways to reduce the vulnerability of prey species to

predation, and will cooperate with federal and state agencies, counties, and others to promote activities on public and private lands that will limit predator impacts. Such activities may include working with landowners and land managers to reduce winter concentrations of prey species (especially where artificially concentrated by food resources), and working with recreation managers to direct or reduce human activities that may increase the vulnerability of prey species to predators.

V. PREDATION MANAGEMENT PLANS

Predation management plans will be prepared using the following outline:

1. ***Definition of the problem.*** This definition must include a rationale for the proposed action. Such a rationale may include:
 - A. a proposed management action (such as the introduction of a small number of animals into suitable but unoccupied habitat) that may be adversely affected by the presence and predictable actions of predators,
 - B. a finding that approved wildlife management objectives are not being met due in large part to the actions of predators, or
 - C. evidence that wildlife recruitment or populations has been or will be adversely impacted by the presence of predators.
2. ***Risk Assessment.*** A discussion of the ramifications of the program, including potential effects on:
 - A. predator populations (i.e., will removal of avian roosting trees near a waterfowl production area affect non-targeted species, such as bald eagles? Will removal of specific individual animals result in vacant home ranges that will be especially attractive to transient predators of the same species?)
 - B. prey or benefiting species,
 - C. sportsmen and wildlife-associated recreational opportunity,
 - D. landowners in or near the impacted area, and
 - E. groups that will strongly favor or oppose the proposed action.
3. ***Program.*** A discussion of the specific proposed treatment, including:
 - A. clearly-defined boundaries,
 - B. the species of predator(s) affected,
 - C. the prey or other species to benefit from any proposed action,
 - D. the method or techniques identified to address identified concerns, including habitat manipulation where appropriate and the method(s) of predator removal (if removal is a component of the program),
 - E. the objective and measure of success used to determine whether that objective has been achieved,
 - F. date of initiation of actions,
 - G. measurable objectives and monitoring plans to assess program effectiveness, and
 - H. budget.

All predator management plans will be reviewed by the chief of the Bureau of Wildlife and regional supervisor. Predator management plans must be approved by the director. Predator management plans will be reviewed and evaluated annually.

VI. REVISION DATE

This policy shall be reviewed on or before June 30, 2005.









wildlife conservation and management

Email: scott_becker@fws.gov

From: Odell - DNR, Eric <eric.odell@state.co.us>

Sent: Monday, June 6, 2022 11:36 AM

To: Becker, Scott A <scott_becker@fws.gov>

Subject: [EXTERNAL] Idaho and big game

This email has been received from outside of DOI - Use caution before clicking on links, opening attachments, or responding.

Can you send me some brief speaking points on how Idaho has used wolf impacts on ungulates to justify and implement any sort of wolf mgmt? I know we've talked about this briefly before, but I would like to have a few more details at my fingertips. I know other states have it in their plans, and 10J has considered it before as well - having tangible information on how it has been applied (and if it's been determined to have been effective) would be really helpful. I have a meeting next week where I will be asked to discuss this, so if you can get me something by the end of the week, that would be awesome.

Thanks,

Eo

--

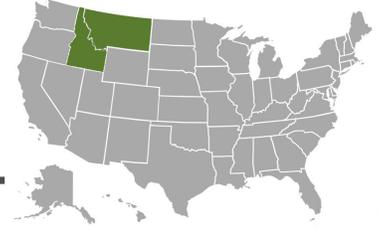
Eric Odell
Species Conservation Program Manager
Terrestrial Section



P 970.472.4340 | F 970.472.4458 | C 970.217.3915
317 West Prospect Road, Fort Collins, CO 80526
eric.odell@state.co.us | cpw.state.co.us



**FOUNDATION
FOR WILDLIFE
MANAGEMENT**



*Ensuring ungulate populations
recover in areas negatively impacted by wolves*

[Home](#) > [About](#) > Reimbursement Process

IMPORTANT ANNOUNCEMENT:

AS OF NOVEMBER 29TH, 2021 WOLF CONTROL BOARD FUNDS HAVE BEEN DEPLETED AND THEREFORE, ASIDE FROM THE 2021 COMMUNITY CHALLENGE GRANT FUNDS IN THE PANHANDLE AND CLEARWATER UNITS, ALL UNITS HAVE RETURNED TO STANDARD F4WM RATES OF:

- \$500 STATEWIDE**
- \$750 IN ALL UNITS NOT MEETING ELK MANAGEMENT OBJECTIVES**
- \$1000 IN UNIT 1**

Reimbursement Process

The Reimbursement Process

The reimbursement request process is quite simple- to request a reimbursement, follow the detailed steps below:

1. The first step is to **make certain your membership is current**. You must be a member of F4WM prior to harvesting your wolf to qualify for reimbursement. (The exception to this is when IDFG Grant funding is being used for the reimbursement, which requires F4WM to reimburse both members and non-members alike). Please allow 7 days for membership processing. Membership must be approved and processed prior to being eligible for reimbursement. Once your membership is processed, you will be eligible for expense reimbursement when you harvest a wolf.
2. **Start saving receipts** prior to harvesting a wolf- receipts need to be for items purchased in relation to the scouting, hunting, or trapping of wolves. These can include items such as fuel, firearms, ammunition, traps, game cameras, outdoor clothing/gear, license & tag fees, ATV/UTV, 4-wheeler, truck purchase or payments, etc.
3. **Upon harvesting a wolf, send us a copy of your expense receipts** for the amount of the reimbursement, based on the unit of harvest (See the chart above) and a copy of your Idaho Fish & Game mortality report (pink slip) proving it was a legal harvest, and what unit the wolf was harvested in). Reimbursement documentation can be sent via email to leisa@f4wm.org or by mail to F4WM Po Box 821 Ponderay, ID 83852. **You keep the wolf.**

Once we receive and verify your reimbursement requests, your check will be mailed within 5-7 business days. Please direct any questions related to harvest reimbursements to Secretary/Treasurer Leisa Wood at leisa@f4wm.org.

With the help of your membership or donation, F4WM is able to help hunters and trappers offset high operating costs with a reimbursement for each wolf harvested.

Please help us today by joining or renewing your membership! (Auto renew is available)

F4WM Wolfers... Your program needs you, now more than ever...

The Idaho Fish and Game Commission and Idaho Wolf Control Board have called on F4WM to step up our wolf control efforts where they are needed most. Not only are Idaho elk below management objectives in numerous units, but Idaho Ranchers continue to suffer losses due to overabundant wolf populations as well. For those reasons, the Idaho Fish and Game Commission has voted to route \$200,000 through the Idaho Wolf Control Board, to increase F4WM program reimbursement amounts as incentive to encourage sportsmen who recreate in Idaho, to get in the woods and help reduce wolf populations where they are causing the most problems.

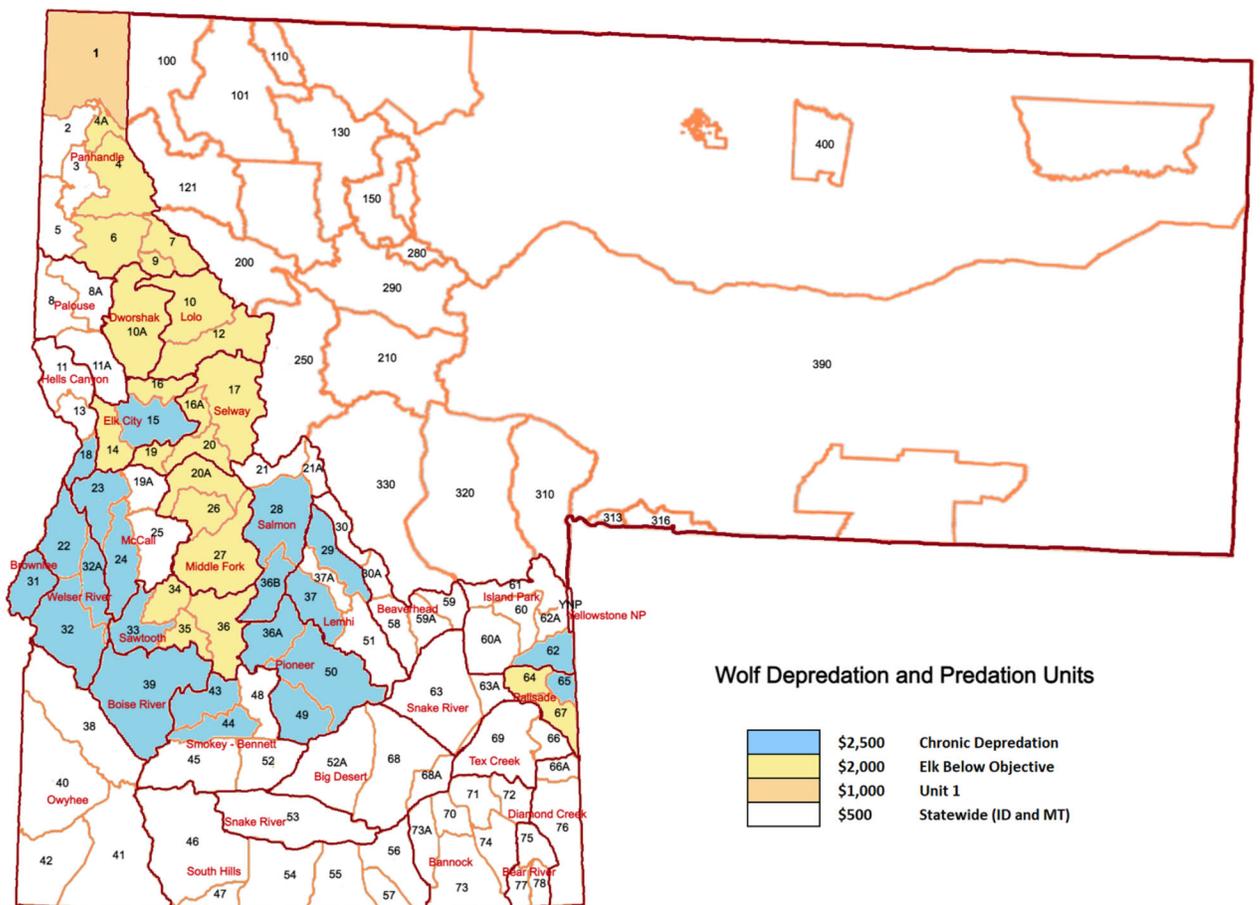
This is a huge opportunity for sportsmen to prove that our F4WM program is an effective management tool, and we at F4WM are calling on our membership, asking you to step up your game, and prove to the state of Idaho that you have what it takes to get the job done.

As mentioned, this ask does not come without incentive... For the coming season, using the Commission funds routed through the IWCB, F4WM is increasing wolf harvest reimbursement amounts to \$2000 per wolf in all units where predators are keeping elk from meeting management objectives, and \$2500 in all units where wolves are chronically preying on Livestock. (Priority units/levels selected by IDFG)

The map below shows these units and is color coded to simplify reimbursement layouts for this 2021- 2022 season. Should WCB and Grant funding be depleted prior to end of June 2022, all colored units will be reduced to the previous \$1000/\$750/\$500.

(Please note: Increased reimbursement zone additional funding has been added largely by State agencies. Montana will remain at \$500 statewide until which time we are able properly identify needed increased funding units through input from Montana FWP, Commission, and Livestock related industry leadership. We will be working to identify these areas throughout the coming year.)

Two States, One F4WM



With this incentive comes great responsibility... Its important to remember that as wolfers, we are under great scrutiny... With all the legislative work being done to increase our abilities to better manage wolf populations, we are being watched closer now then ever before... It is of the

utmost importance that we use our best judgement on when and where we are setting wolf traps... If you think someone will likely see a wolf in a trap your about to set... Please don't set there. If you think someone walking their dog or out for a Sunday stroll with their family will get their dog caught in the trap your about to set, Please do not set there... Although most bycatch are released unharmed, the last thing we need is conflict with other land-users.

We must also work together as a team, and not squabble over trapping territories... Be kind, courteous, and respectful of one another, as well as of land owners and other land user groups. We must police ourselves and follow the highest ethical standards to maintain a positive reputation as sportsmen, as game managers, and as representatives of our F4WM program. If You see a wolf in a trap that is not yours, do not approach it. Back out of the area immediately and make effort to let the trapper know he has a catch. The more we can help each-other and communicate with one another the higher our overall rate of success will be.

It is important to note that those who intentionally cause drama or conflict will be suspended from reimbursement eligibility indefinitely, depending on the situation. Theft of gear or wolves will not be tolerated, and will be grounds for immediate permanent termination from reimbursement eligibility. It is also a Felony to falsify information on your Check in slip with IDFG, including location of harvest... All suspected fraudulent submittals will be handed over to authorities for investigation and possible DNA sampling. Please do not falsify info or attempt to steal from your own F4WM program- it will end poorly for all of us.

If you have any questions, please feel free to contact me directly. Just please be patient as I too will be running gear and making every effort to do my part.

Thank you for all you do for Sportsmen and Wildlife... Thank you for all you do for F4WM... Good luck out there, and please remember – F4WM is counting on you... I am counting on you... Idaho sportsmen are counting on you... Idaho wildlife are counting on you...

"Lace up you boots ladies and gentlemen... We've got a job to do!"

Sincerely,
Justin Webb
F4WM Executive Director
justin@f4wm.org
208-610-4455

FOUNDATION FOR WILDLIFE MANAGEMENT | ALL RIGHTS RESERVED

info@f4wm.org

PO Box 821
Ponderay, ID 83852

RENEW

JOIN

DONATE

**Idaho Department of Fish and Game Predation Management Plan
For the Lolo and Selway Elk Zones
Revised December 13, 2011**

1. INTRODUCTION
2. DEFINITION OF PROBLEM
 - a. Elk Population Management Objectives and Current Status
 - i. History of Elk Population Decline
 - b. Efforts to Address Lolo and Selway Zones Elk Declines
 - i. Efforts to Improve Elk Habitat
 - ii. Changes in Elk Hunting Seasons
 - iii. Changes in Black Bear and Mountain Lion Hunting Seasons
 - iv. Initial Wolf Seasons
3. RISK ASSESSMENT
 - a. Predator Populations
 - b. Prey Populations and Other Species
 - c. Sportsmen and Wildlife-Associated Recreational Opportunity
 - d. Landowners In or Near the Impacted Area
4. PROGRAM
 - a. Boundaries
 - b. Methods
 - c. Objective and Measures of Success
 - d. Monitoring
 - e. Initiation of Predator Reductions
 - f. Budget
5. LITERATURE CITED
6. APPENDICES
7. FIGURES

**Idaho Department of Fish and Game Predation Management Plan
For the Lolo and Selway Elk Zones
Revised December 13, 2011**

INTRODUCTION

A "Policy for Avian and Mammalian Predation Management" was adopted by the Idaho Fish and Game Commission (Commission) in August 2000 (see Appendix 1). This policy identifies a protocol whereby a predation management plan must be written when certain conditions are met and problems are identified. As directed by the policy, the Predation Management Plan for the Lolo and Selway Elk Zones in the Clearwater Region has been reviewed and revised regularly. This management plan identifies ongoing efforts to reduce adverse impacts of factors influencing the Lolo and Selway elk populations and identifies approaches to monitor the effects of predator-caused reductions. Actions will be taken in conjunction with state management plans for individual species (wolf, bear, mountain lion, and elk) to ensure species management objectives are met.

DEFINITION OF PROBLEM

Elk numbers are currently well below management objectives in the Lolo and Selway Zones. Since the early to mid 1990s, elk calf to cow ratios have continued to decline, and have been at levels too low to sustain elk populations. More recently, cow survival rates have also declined to problematic levels. A number of factors have been identified as contributors to this situation. Declining habitat conditions caused by a shift from early forest seral stages to much less productive mid to late seral stages have been a source of concern for decades. More recently, the spread of noxious weeds (especially spotted knapweed) has also contributed to the decline in elk habitat quality. A major winter event in 1996-97, with record snowfall more than 200% of normal, caused a severe winter die-off that resulted in a population decline. White et al. (2010) documented heavy predation on neonate elk calves by black bears as additive and the primary proximate mortality factor of neonate calves (age \leq 90 days). Additionally, predation by mountain lions was prevalent on all age classes of elk (Zager et al. 2007a, Zager et al. 2007b, White et al. 2010). Currently wolves, which were not present during the early portion of this elk decline, are a major mortality factor on older calves (\geq 6-month old) and cow elk (Zager et al. 2007b, Pauley et al. 2009). Lower cow and calf survival due to wolves is continuing to suppress the elk population (Pauley et al. 2009, Pauley and Zager 2011).

Elk Population Management Objectives and Current Status

Elk abundance objectives were established in the current elk management plan (Kuck 1999). The management objectives in the Lolo Zone (Game Management Units [GMUs] 10 and 12) are to maintain an elk population consisting of 6,100 – 9,100 cow elk and 1,300 – 1,900 bull elk. Objectives for the Selway Zone (GMUs 16A, 17, 19, and 20) are 4,900 – 7,300 cow elk and 1,325 – 1,925 bull elk. The cow and bull elk abundance objectives for these zones were established at levels to allow growth and recovery of these depressed populations over time.

These objectives were set to levels believed to be sustainable by Lolo and Selway zone elk habitat.

The most recent sightability survey in the Lolo Zone (2010) revealed 1,358 cow elk and 594 bull elk. Thus, bull elk and cow elk were well below objectives in 2010. In the Selway Zone survey (2007), the 3,381 cow elk and 934 bull elk estimated also fell below management objectives.

History of Elk Population Decline

The Lolo and Selway elk zones are composed primarily of public lands (97%) managed by the USFS. Habitat conditions in this portion of the Clearwater Region that had contributed to increasing elk populations in the past were a result of extensive fires that covered the majority of these units early in the century. Conditions favorable to elk likely peaked 10 - 40 years following the fires of 1937, and slowly declined after that. Brush fields slowly grew up and noxious weeds such as spotted knapweed started to become established on winter ranges in these two zones, reducing the quality of the habitat for elk. Not only did food become more limiting for elk during winter, but the extensively overgrown brush fields in calving areas may have allowed predators to be more effective.

These areas traditionally had high levels of habitat disturbance. Intense wildfires were prevalent in the early 1900s over much of the landscape. Also, in the early 1900s, blister rust decimated western white pine (*Pinus monticola*) stands, one of the dominant species. Subsequent fire suppression eliminated much of the natural disturbance once part of the system. This created a landscape that is dominated by mid-succession forest lacking early seral stages. Historically 35% to 45% of the landscape was early seral stage, compared with 14% currently (USDA Forest Service 1999). Similar trends likely occurred in the Selway. Much of recent disturbance in the Lolo Zone has come in the form of logging (which peaked in the 1970's and 1980's and has since declined to low levels) rather than wildfire.

The Lolo Zone elk population peaked in 1989 at an estimate of 16,054 elk (IDFG, unpublished data) and subsequently declined sharply due to low calf recruitment. This was followed by the winter of 1996-97, when a record snowfall (200% of normal) occurred. Many elk died as a result of the deep snow and persistent winter conditions. Very low calf to cow ratios were evident for several years following the record winter.

Concerns over persistent low calf recruitment prompted the initiation of a research study in the Lolo Zone in 1997. Research findings revealed low calf recruitment was a function of low calf survival. The proximate cause of neonate (age \leq 90 days) calf mortality was from black bears and mountain lions (White et al. 2010). Calf mortality from black bear predation was additive and manipulation of black bear densities through increased harvest resulted in higher calf survival (White et al. 2010). Additionally, elk calves with lower birth weight, which is typically tied to habitat condition, were likely pre-disposed to predation (White et al. 2010). After wolves had become well established in the Lolo zone, efforts to measure adult cow elk mortality and older (\geq 6-month) calf mortality between mid-December and June 1 revealed high mortality rates, largely caused by wolf predation (Zager et al 2007b, Pauley et al. 2009, Pauley and Zager 2011). For instance, during 2005-2007 and 2009-2010, >90% of known-

cause deaths of radio-marked cow elk were due to predation, of which 76% (37 of 49) were caused by wolves. During this same time period >88% of known- cause deaths of radio-marked older calves were due to predation, of which 73% (22 of 30) were caused by wolves. Of all calf and cow predator-related deaths, wolves were the primary cause for 75% (IDFG, unpublished data; Pauley and Zager 2011)

Clearly, several factors have contributed to these declining elk populations. At various times and at different population levels, these various factors have (and continue to) exert varying levels of impact. However, at the present time and at current elk population status, wolf-caused mortality is the major factor limiting calf recruitment and cow elk survival and, therefore, elk abundance and achievement of Idaho Department of Fish and Game (IDFG) objectives. These same factors are believed to be driving elk populations in the Selway Zone.

Efforts to Address Lolo and Selway Zone Elk Declines

Efforts to Improve Elk Habitat

IDFG's primary habitat management influence has been through collaboration with the USFS and interested publics to address habitat concerns. The focus has been to increase fire frequency through prescribed fire and more liberal "let burn" policies. IDFG has also actively encouraged efforts to control noxious weeds and to close roads to improve elk habitat effectiveness and harvest vulnerability. IDFG has been involved in several collaborative efforts focused on manipulating habitat to favor elk. These have included the Clearwater Basin Elk Habitat Initiative (1998), the Clearwater Elk Summit (2003), and the Clearwater Elk Collaborative (2003).

Some of the recommendations that were developed from these efforts have been implemented or have been incorporated into planning for future projects. From 2006 to 2009, 50,911 acres were burned from prescribed fire in many areas of the Clearwater and Nez Perce national forests. Additional acres are scheduled for prescribed fire over the next 3 to 4 years and additional burn areas will likely be added in the near future.

Changes in Elk Hunting Seasons

The first major changes in hunting seasons to reduce bull elk harvest were implemented in 1992. Prior to 1992, GMUs in the Clearwater Region were open to hunting by all regular season tag holders. Beginning in 1992, hunters were required to choose to hunt in either the less accessible Mountain units or in the remaining, more accessible units. In the Clearwater Region, GMUs in the Lolo and Selway Zones were managed in the Mountain Group. This season structure change was implemented to reduce hunter densities. In addition, the opening day of rifle hunting season in GMUs 10 and 12 was moved back to October 10 to move the rifle season out of the rut. These changes reduced general hunt bull harvest within the Mountain Group GMUs in the Clearwater by 45% between 1992 and 1993. Harvest decreased from 2,037 bulls in 1992 to 1,116 in 1993 and the number of hunters declined from 8,944 to 5,093 (-43%) while hunter success remained stable (Kuck 1994).

The next major change in season structure came in 1998 with the completion of a new elk management plan. A zone system with an A-tag and B-tag structure was implemented in the 1998 hunting season. This grouped GMUs 10 and 12 into the Lolo Zone and 16A, 17, 19, and 20 in the Selway Zone.

In the Lolo Zone, the A-tag offered an early archery season for any elk August 30 to September 30 with unlimited tags available. The B-tag offered an any-weapon hunt for an antlered elk from October 10 to November 3. B-tag numbers were capped at 1,600, which represented a 50% reduction in rifle season bull elk hunters. With the implementation of the zone system in 1998, the controlled hunts for cows were eliminated in GMUs 10 and 12. It should be noted that antlerless harvest in the Lolo Zone under the A-tag has been minimal. Harvest has varied between 2 and 20 animals, averaging 7.5 antlerless elk/year from 1998-2005; antlerless elk hunting opportunity was eliminated in 2006. IDFG further reduced hunting opportunity for elk for the 2010 season by lowering the Lolo B-tag quota by 32% and by placing a quota on the A-tag (404 tags). This action followed the results of the 2010 elk survey that indicated continued declines in elk numbers and was in addition to large reductions in hunter numbers previously implemented. The overall result since 1998 to the present is that tags have been reduced from 5,672 to 1,492 (74% reduction) in response to declining elk populations.

In the Selway Zone, both the A-tag and B-tag hunts are any weapon, antlered-only hunts. The A-tag hunt runs from October 1 to October 30 and tags are available in unlimited numbers. The B-tag dates are September 15 through September 30 and November 1 through November 18; B-tag numbers were capped at 1,255 in 2000. Antlerless controlled hunts were eliminated in 1996, and in 1999 general season antlerless harvest was eliminated. Declines in elk estimated from the 2007 survey, prompted reductions in the B-tag quota to 1,067 and the season length by 7 days; the A-tag limit was set at 647 tags. The overall result since 1998 to the present is that tags have been reduced from 3,472 to 1,714 (51% reduction) in response to declining elk populations.

The net effect of these season changes and declining elk numbers in the Lolo Zone has been a reduction from 65,472 hunter days (1988) to 6,648 (2010) and a change in harvest from 2,184 bulls (1988) to 124 (2010). Current hunter days represent only 10% of 1988 levels, while current bull elk harvest is 6% of that observed in 1988. Similarly, the effect in the Selway Zone was a decline in hunter days from 39,814 in 1988 to 7,831 (-80%) hunter days in 2010. Harvest in the Selway Zone fell from 837 bulls in 1988 to 142 (-83%) in 2010 (Kuck 1994, Rachael 2011).

Changes in Black Bear and Mountain Lion Hunting Seasons

The Lolo and Selway zones have a history of liberal black bear and mountain lion seasons. The use of dogs and baiting has been allowed for hunting bears, and female mountain lion harvest has not been restricted by quotas. In the mid-1990's, longer take seasons were implemented for both species.

Beginning in the fall of 1999, and in subsequent years, a series of changes to bear and mountain lion seasons was implemented in response to concerns over poor elk calf recruitment rates. These changes have included establishment of a 2-bear and 2-mountain lion bag limit, a

reduction in nonresident tag prices, an increase in nonresident hound hunter permit levels, approval for use of nonresident deer tags for harvest of a bear or lion, and use of electronic calls for hunting lions. Additionally, coordination with the Idaho Outfitters and Guides Board and the USFS, led to the development of a process by which outfitters could operate within neighboring outfitters' areas (outfitter area overlap) to increase harvest of black bears and mountain lions.

These changes resulted in a doubling of black bear harvest by 1998, and black bear harvest has since remained at higher levels than in previous years. The liberal black bear season framework remains in place to date. By contrast, mountain lion harvest demonstrated an initial increase, particularly in GMU 12, and then a declining trend in harvest post 2000. This is more likely a population response driven by a declining prey base for this obligate predator, a decline in participation by hound hunters (concerns with turning dogs loose in wolf country), and the effects of snow conditions on access and effective tracking rather than a response to season changes. Although alternate prey, primarily whitetail and mule deer, are available to lions in these GMU's, these prey species are found at low densities.

Initial Wolf Hunting Seasons

Following delisting of the wolf in Idaho in 2009, the Commission authorized Idaho's first wolf hunting season with zone-specific harvest limits and a statewide harvest limits for 2009-2010 of 220 wolves. The wolf season for the Lolo Zone ran from 1 September to 31 March with a harvest limit of 27 wolves with an additional 12 wolves allocated to the Nez Perce Tribe; the Selway Zone season ran from 15 September to 31 March with a harvest limit of 17 wolves with an additional 7 allocated to the Nez Perce Tribe. No tribal harvest was reported. Neither zones wolf sport harvest limit was met during the 2009-2010 season (Lolo: 13 wolves; Selway: 11 wolves). Despite long seasons, sport harvest was insufficient to reach wolf harvest goals for the zones. Contributing factors affecting wolf harvest rates included difficult access for hunters, rugged, forested terrain, and less than ideal weather conditions to bring wolves to lower, more accessible areas. The wolf hunting season for 2010-2011 was suspended when wolves were relisted in August 2010. This was followed by Congressional action that delisted wolves in Idaho and Montana in spring 2011. As a result, the Commission set wolf hunting seasons for the 2011-2012 seasons at their July meeting. Seasons for both the Lolo and Selway zones were set to run from 30 August to 30 June with no harvest limit. Idaho's first wolf trapping seasons were also established to run from 15 November to 31 March in these zones.

RISK ASSESSMENT

Predator Populations

The reduction in predators will be limited to black bear, mountain lions, and wolves under this plan.

Bear season changes and associated actions that were implemented under the previous version of this plan were intended to increase bear harvest rates to meet a "heavy" harvest goal. However, only "light" to "moderate" harvest rates have been achieved (White 2010a). Liberal

harvest opportunities will continue to be offered to bear hunters and these are not expected to put bear populations in these zones at risk.

Even with liberal lion hunting seasons, lion harvest appears to be self-regulating in these zones. Declines in elk numbers has been followed by declines in the numbers of mountain lions which has in turn led to lower hunter participation and harvest rates (White 2010b). Lion harvest remains low and does not appear sufficient to put lion populations at risk.

As of December 31, 2010, there was a minimum of 87 wolf packs and 46 documented breeding pairs in Idaho (Holyan et al. 2011). Of the 87 packs documented in 2010, 78 are completely outside the Lolo and Selway Zones and would not be affected by actions authorized under the predator management plan. Of the 46 breeding pairs documented during 2010, 38 are completely outside of the Lolo and Selway Zones and would not be affected by the proposed actions. More than 595 wolves, out of the minimum estimated for Idaho at the end of 2010, would be outside the Lolo and Selway Zones proposed action.

Wolf removal rates of 30-35% or less typically do not cause any long-term changes in wolf abundance, while sustained removals of 40% or more may cause long-term reductions (Gasaway et al. 1983, Keith 1983, Peterson et al. 1984, Peterson and Page 1988). However, wolf populations have sustained human-caused mortality rates of 30 to 50% without experiencing declines in abundance (Keith 1983, Fuller et al. 2003). Gasaway et al. (1983) found wolf abundance was unchanged with 16-24% harvest, but declined 20-25% after harvests of 42-61%. Wolf populations tend to compensate for low removal rates and return to pre-removal levels rapidly, potentially within a year. Once removals end, the wolf population would be expected to return to pre-removal levels rapidly (National Research Council 1997: Table 3.1). Consequently, once a wolf population is reduced to a desired level, it is necessary to remove wolves during subsequent years to maintain reduced wolf abundance.

This localized wolf reduction effort will be a positive step toward improving elk survival in two very important elk management zones and will not affect the ability to maintain Idaho's wolf population well above the recovery management objective of 15 breeding pairs and 150 wolves.

Prey Populations and Other Species

Elk will be the primary species benefitting from the proposed actions in this plan. Predation continues to be a major factor influencing the survival of elk in the Clearwater backcountry. Other prey species will benefit as well, including moose, whitetail deer, and mule deer. Also, wolf reductions may have some indirect consequences for bears that may have fewer opportunities to usurp or scavenge wolf kills. Lions on the other hand, may benefit from a reduction in competition with wolves for prey in addition to lower mortality rates from wolf-related deaths.

Sportsmen and Wildlife-Associated Recreational Opportunity

Sportsmen and sporting groups were among the first to voice their concerns regarding the impacts of predation on elk populations in the Clearwater Region. Loss of opportunities to

hunt generous populations of elk has generated considerable input from the hunting public regarding both the cause of reduced opportunities, as well as potential solutions to bring about reversal of the trend. This input has not been limited to ways to maintain adequate populations of ungulates for hunting, but has also included concerns with the deleterious effects on predator populations as well.

Current levels of opportunity for hunting and viewing elk are substantially reduced from that available in years past. Implementation of actions designed to reduce the impacts of predation on elk will, over time, result in a subsequent increase in opportunities for sportsmen and for other wildlife-associated recreationists whose focus is this species. It is expected that the actions under this plan will be favored by many groups such as Rocky Mountain Elk Foundation, Idaho Outfitters and Guide Association, Idaho Anti-Wolf Coalition, and livestock producer groups such as the Idaho Cattle Association and the Idaho Woolgrowers Association. By contrast, those recreationists whose focus is to view wolves in the wild may experience some additional difficulty in achieving that goal due to decreased wolf numbers or changes in behavior. The same groups that opposed wolf delisting, such as Defenders of Wildlife, Earth Justice, Natural Resources Defense Council, Sierra Club, Humane Society, and Friends of the Clearwater are likely to oppose the actions proposed under this plan.

Landowners In or Near the Impacted Area

Nearly all of the Lolo Zone (2,355 square miles) and the Selway Zone (2,542 square miles) are in Federal ownership. Lolo Zone ownership is 95% USFS, of which 14% is wilderness, and 1% State and 4% private timber company land; the Selway Zone is more than 99% USFS, of which 79% is wilderness, and has <1% private lands. Actions proposed in this plan are not expected to impact these landowners.

PROGRAM

Boundaries

Efforts to reduce the numbers of black bears, mountain lion, and wolves addressed in this predation management plan will be limited to the Lolo Zone (GMUs 10, 12) and the Selway Zone (GMUs 16A, 17, 19, 20) (see Figure 1).

Methods

Sport harvest is IDFG's primary tool for predator reduction in the Lolo and Selway zones. IDFG may authorize agency control actions on predators where hunter harvest does not sufficiently reduce predation impacts

Liberal black bear and mountain lion hunting opportunities will continue to be offered through longer seasons, higher bag limits, reduction in nonresident tag prices, increase in nonresident hound hunter permit levels, approval to use nonresident deer tags for harvest of a bear or lion, and most recently the use of electronic calls for hunting bear and lion. Liberal wolf hunting opportunities will continue to be offered through longer seasons and larger harvest limits for

these zones compared with others. Relatively restrictive harvest methods for wolves have not been sufficient to achieve removal rates.

IDFG will use an adaptive strategy to reduce the wolf population in the Lolo and Selway zones. Wolf numbers will be reduced to manage elk populations toward stabilization and eventual recovery as measured by IDFG elk population objectives (Rachael 2011). The initial step in this strategy began with a 7-month season (September 2009 – March 2010) with regulated sport harvest limits of 27 and 17 wolves in the Lolo and Selway zones, respectively, and an estimated tribal allocation. Both hunting and trapping seasons have been set for 2011-2012. Harvest will be monitored as the season progresses, but the desired removal rates are not expected to be achieved in these zones, and IDFG will consider additional measures to decrease wolf numbers.

Objective and Measures of Success

The objective of the Predator Management Plan is to affect an increase in elk numbers in the Lolo and Selway zones to move these populations toward stabilization and eventual recovery by reducing predator populations. Success will be measured by comparing elk status with IDFG elk population objectives (Rachael 2011).

Monitoring

Progress toward the elk plan objectives will be evaluated by monitoring changes in elk abundance, trends in abundance, and mid-winter recruitment rates measured with aerial surveys using the sightability survey approach (Unsworth et al. 1994). A zone-wide elk sightability survey was conducted in 2010 in the Lolo Zone and a survey will be conducted in 2013 in the Selway Zone. Timing of future surveys will follow IDFG's big game survey schedule. As part of the Statewide Ungulate Ecology Research Study, smaller scale sightability surveys (encompassing the GMU 10 study area) begun in 2009 will be conducted during years that zone-wide surveys are not scheduled (Pauley et al. 2007). Additionally, this research effort will provide measures of calf elk survival from mid-December through May and annual cow survival from radio-collared elk.

Harvest rates of bears, mountain lions and wolves will be monitored through the standard process of completion of Big Game Mortality Report Forms by each successful hunter. These forms provide detailed information for each individual animal harvested and are accompanied by extraction of a tooth for aging and attachment of an identification tag to each pelt.

Initiation of Predator Reductions

Efforts to reduce bear and lion numbers in the Lolo and Selway zones will continue as they have for the past several years. Wolf reductions were initiated with the implementation of the 2009-2010 wolf hunting season and is continuing with the 2011-2012 season. Further removal measures are planned to achieve additional wolf reduction.

Budget

The funds required to implement actions in this plan are available as part of larger, ongoing IDFG programs. Aerial surveys as listed are funded through statewide ungulate monitoring budgets. The GMU 10 research study is a component of current long-term research being conducted by IDFG's elk research staff. Funds for these efforts come from combination of federal wolf appropriations and Pittman-Robertson funds, and IDFG license dollars. IDFG has requested a \$100,000 enhancement in the FY 2013 budget in preparation for future efforts associated with this and other predation management efforts.

LITERATURE CITED

- Fuller, L., D. Mech, and J. F. Cochrane. 2003. Wolf population dynamics. Pages 161-191 *in* L. D. Mech and L. Boitani, editors. *Wolves: behavior, ecology, and conservation*. University of Chicago Press, Chicago, Illinois, USA.
- Gasaway, W. C., R. O. Stephenson, J. L. Davis, P. E. Sheppard, and O. E. Burris. 1983. Interrelationships of wolves, prey, and man in interior Alaska. *Wildlife Monographs* 84.
- Holyan, J., K. Holder, J. Cronce, and C. Mack. 2011. Wolf conservation and management in Idaho: progress report 2010. Nez Perce Tribe Recovery Project, P.O. Box 365, Lapwai, Idaho, USA.
- Keith, L. B. 1983. Population dynamics of wolves. Pages 66-77 *in* L. N. Carbyn, editor, *Wolves in Canada and Alaska*. Canadian Wildlife Service Report.
- Kuck, L. (compiler). 1994. Statewide Surveys and Inventory: Elk. Progress Report, Project W-170-R-18, Study 1, Job 1. Idaho Department of Fish and Game, Boise.
- Kuck, L. (project leader). 1999. Idaho Elk Management Plan. Idaho Department of Fish and Game, Boise, USA.
- National Research Council. 1997. *Wolves, bears, and their prey in Alaska*. National Academy Press, Washington, D.C., USA.
- Pauley, G., M. Hurley, C. White, and P. Zager. 2007. Statewide ungulate ecology study plan: Effects of wolf predation on elk survival. Idaho Department of Fish and Game, Boise, USA.
- Pauley, G., M. Hurley, C. White, and P. Zager. 2009. Effect of wolf predation on elk demographics in the Lolo elk management zone, Idaho. Abstract of the Idaho Chapter of The Wildlife Society Annual Meeting, 10-12 March, Moscow, Idaho, USA.
- Pauley, G. R., and P. Zager. 2011. Study II: Effects of wolf predation on elk populations. Pages 38-47 *in* B. B. Compton, compiler and editor. Job Progress Report. Project W-160-R-37. Idaho Department of Fish and Game, Boise, USA.
- Peterson, R. O., and R. E. Page. 1988. The rise and fall of Isle Royale wolves, 1975-1986. *Journal of Mammalogy* 69:89-99.
- Peterson, R. O., R. E. Page, and K. M. Dodge. 1984. Wolves, moose, and the allometry of population cycles. *Science* 224:1350-1352.

- Rachael, J. 2011. Elk. Job Progress Report. Project W-170-R-34, Study I: Big game population status, trends, use, and associated habitat studies. Idaho Department of Fish and Game, Boise, USA.
- Unsworth, J. W., F. A. Leban, D. J. Leptich, E. O. Garton, and P. Zager. 1994. Aerial Survey: User's Manual. Second edition. Idaho Department of Fish and Game, Boise, USA.
- USDA Forest Service. 1999. BHROWS Assessment: North Fork Big Game Habitat Restoration on a Watershed scale – Watersheds within the North Fork Clearwater River Subbasin. Clearwater National Forest, Orofino, Idaho, USA.
- White, C. 2010a. Black Bear. Job Progress Report. Project W-170-R-33, Study I: Big game population status, trends, use, and associated habitat studies. Idaho Department of Fish and Game, Boise, USA.
- White, C. 2010b. Mountain Lion. Job Progress Report. Project W-170-R-33, Study I: Big game population status, trends, use, and associated habitat studies. Idaho Department of Fish and Game, Boise, USA.
- White, C. G., P. Zager, and M. Gratson. 2010. Influence of predator harvest, biological factors, and landscape elk calf survival in Idaho. *Journal of Wildlife Management*. 74(3): 355-369.
- Zager, P., C. White, and G. Pauley. 2007a. Elk ecology. Study IV. Factors influencing elk calf recruitment. Idaho Department of Fish and Game Federal Aid in Wildlife Restoration Completion Report W-160-R-33, Boise, USA.
- Zager, P., C. White, G. Pauley, M. Hurley. 2007b. Elk and predation in Idaho: Does one size fit all?, *Transactions of the North American Wildlife and Natural Resources Conference* 72:320-338.

APPENDIX 1. Policy for Avian and Mammalian Predation Management.

ADOPTED AUGUST 24, 2000

I. PURPOSE

The Idaho Department of Fish and Game (Department) has a responsibility to preserve, protect, perpetuate and manage all wildlife in the state and to provide continued supplies of such wildlife for hunting, fishing and trapping. To fulfill its responsibility, the Department must efficiently and effectively manage populations of predators as well as populations of prey species to meet management objectives. The Department recognizes predator management to be a viable and legitimate wildlife management tool that must be available to wildlife managers when needed. However, the Department also recognizes that predator removal is controversial both publicly and professionally. The purpose of this policy is to provide the Department direction in managing predator populations consistent with meeting management objectives for prey species populations.

This policy does not apply to emergency response situations where the Department must act to protect human health and safety.

II. DEFINITIONS

- A. "Predation" means the act of an individual animal killing another live animal.
- B. "Predator" means any wild animal species subsisting, wholly or in part, on other living animals captured through its own efforts. Predators are defined in Idaho Code as 'big game animals' (black bear and mountain lion), 'migratory birds' (American crow), 'fur-bearing animals' (badger, bobcat, fisher, marten, mink, otter, raccoon, and red fox), and 'predatory wildlife' (coyote, skunk, and weasel). For the purpose of this policy, "predator" will include primarily those avian and terrestrial species subject to Idaho jurisdiction, but may in some cases include species which are protected under the Migratory Bird Treaty Act or the Endangered Species Act. For predatory species protected under these or other federal statutes, the Department may cooperate with the USDA Animal and Plant Health Inspection Service and/or the U.S. Fish and Wildlife Service in addressing predation problems caused by such species.
- C. "Predation management" means the application of professional wildlife management technology to increase or decrease predator populations. Predator management may include management of habitats to benefit or depress populations, selective harvest of individual animals, or generalized harvest over a geographic area.
- D. "Predator removal" means the physical removal of an animal, alive or dead, from an area where its presence is undesirable. Physical removal of live animals for release in habitats already occupied by the same species has been shown to create additional problems as individual animals seek living space (i.e., a home range) within already-occupied suitable habitat; for that reason, predator removal will often but not necessarily require lethal methods.
- E. "Prey" means any animal hunted or killed as food by a predator.

III. POLICY

Predator populations, as with all wildlife in Idaho, will be managed to assure their future recreational, ecological, intrinsic, scientific, and educational values, and to limit conflicts with human enterprise and values. Where there is evidence that predation is a significant factor inhibiting the ability of a prey species to attain Department population management

objectives and the Department decides to implement predation management actions, the management actions will ordinarily be directed by a predation management plan.

Predator populations will be managed through habitat manipulation and/or predator removal as appropriate. Wildlife managers and administrators implementing predation management options will consider the ecological relationships that will be affected. Management decisions will be consistent with objectives or management plans for predators, animals that constitute or contribute to the predator's prey base, affected habitat, and other biological and social constraints.

Idaho Code provides that predatory wildlife (i.e., coyotes, jack rabbits, skunks, starlings, raccoons and weasels) may be taken by any legal means at any time.

On lands managed by the Department, efforts to limit the size of predator populations may include habitat manipulation. The Department may encourage other land management agencies to manipulate habitat under their jurisdiction in a manner to limit the size or effectiveness of predator populations.

The Department, when and where feasible, will rely on sportsmen (licensed hunters and trappers) to take predators classified as game animals and fur-bearing animals, and may alter seasons or harvest rules to meet wildlife management objectives. However, the Department will not support any contests or similar activities involving the taking of predators which may portray hunting in an unethical fashion, devalue the predator, and which may be offensive to the general public. The Department opposes use of bounties as a predator control measure. The Department will not implement a program based, in whole or in part, on utilizing methods involving sterilization or birth control in wild animals. The Department will cooperate with the Animal and Plant Health Inspection Service (APHIS) Wildlife Services Program to address specific areas and species, particularly on private lands, in a manner consistent with the approved interagency Memorandum of Understanding.

The Director may implement a Predation Management Plan in those circumstances where wildlife management objectives for prey species cannot be accomplished within two years by habitat manipulation, sportsman harvest, or interagency action designed to benefit the prey species, and where there is evidence that action affecting predators may aid in meeting management objectives. Essential components of such a Predation Management Plan are defined below.

This policy does not affect existing predator management policies and procedures used to administer livestock depredation issues.

IV. PROCEDURES

Managers recognize the role of predators in an ecological and conservation context. Impacts of the removal of individual predators on the structure of the predator population, as well as the prey population, will be considered. The actions by the Department must be based on the best available scientific information, and will be evaluated in terms of risk management to all affected wildlife species and habitats.

Valid concerns for human health and safety exist. Predator management will consider the need to avoid risk of human injury, loss of life, or potential for disease transmission.

Predator management may occur but is not limited to the following circumstances:

1. In localized areas where prey populations are fragmented or isolated, or where introductions or transplants of potentially vulnerable wildlife species (e.g., bighorn sheep, wild turkeys, sharp-tailed grouse, and others) has occurred or is imminent. Control may be intensive and of sufficient duration to allow transplanted animals and their progeny to become established and to become self-sustaining, or selective with removal efforts directed at specific offending animals.
2. In specific areas where managers are unable to meet management goals and objectives for prey populations due to predation. For example, in areas where survival or recruitment of game animal populations is chronically low and

management plan objectives have not been or cannot be met and where there is evidence that predation is a significant factor, predator control may be initiated.

3. On wildlife management areas, especially those which are managed primarily to provide for production of specific species (e.g., waterfowl), provision of critical winter range, and those acquired and managed to provide specific mitigation for wildlife losses elsewhere.

Predation Management Plans will consider options other than just predator removal. Various kinds of habitat manipulation can sometimes negate or minimize the effect of predators, including constructing nesting islands, providing cover plantings, or removal of roosts used by avian predators. Preventative actions are important in reducing conflicts with predators; therefore, the Department will seek ways to reduce the vulnerability of prey species to predation, and will cooperate with federal and state agencies, counties, and others to promote activities on public and private lands that will limit predator impacts. Such activities may include working with landowners and land managers to reduce winter concentrations of prey species (especially where artificially concentrated by food resources), and working with recreation managers to direct or reduce human activities that may increase the vulnerability of prey species to predators.

PREDATION MANAGEMENT PLANS

Predation management plans will be prepared using the following outline:

0. Definition of the problem. This definition must include a rationale for the proposed action. Such a rationale may include:
 - A. a proposed management action (such as the introduction of a small number of animals into suitable but unoccupied habitat) that may be adversely affected by the presence and predictable actions of predators,
 - B. a finding that approved wildlife management objectives are not being met due in large part to the actions of predators, or
 - C. evidence that wildlife recruitment or populations has been or will be adversely impacted by the presence of predators.
1. Risk Assessment. A discussion of the ramifications of the program, including potential effects on:
 - A. predator populations (i.e., will removal of avian roosting trees near a waterfowl production area affect non-targeted species, such as bald eagles? Will removal of specific individual animals result in vacant home ranges that will be especially attractive to transient predators of the same species?)
 - B. prey or benefiting species,
 - C. sportsmen and wildlife-associated recreational opportunity,
 - D. landowners in or near the impacted area, and
 - E. groups that will strongly favor or oppose the proposed action.
2. Program. A discussion of the specific proposed treatment, including:
 - A. clearly-defined boundaries,
 - B. the species of predator(s) affected,
 - C. the prey or other species to benefit from any proposed action,
 - D. the method or techniques identified to address identified concerns, including habitat manipulation where appropriate and the method(s) of predator removal (if removal is a component of the program),
 - E. the objective and measure of success used to determine whether that objective has been achieved,
 - F. date of initiation of actions,
 - G. measurable objectives and monitoring plans to assess program effectiveness, and

- H. budget.
- I. All predator management plans will be reviewed by the chief of the Bureau of Wildlife and regional supervisor. Predator management plans must be approved by the director. Predator management plans will be reviewed and evaluated annually.

REVISION DATE: This policy shall be reviewed on or before June 30, 2005.

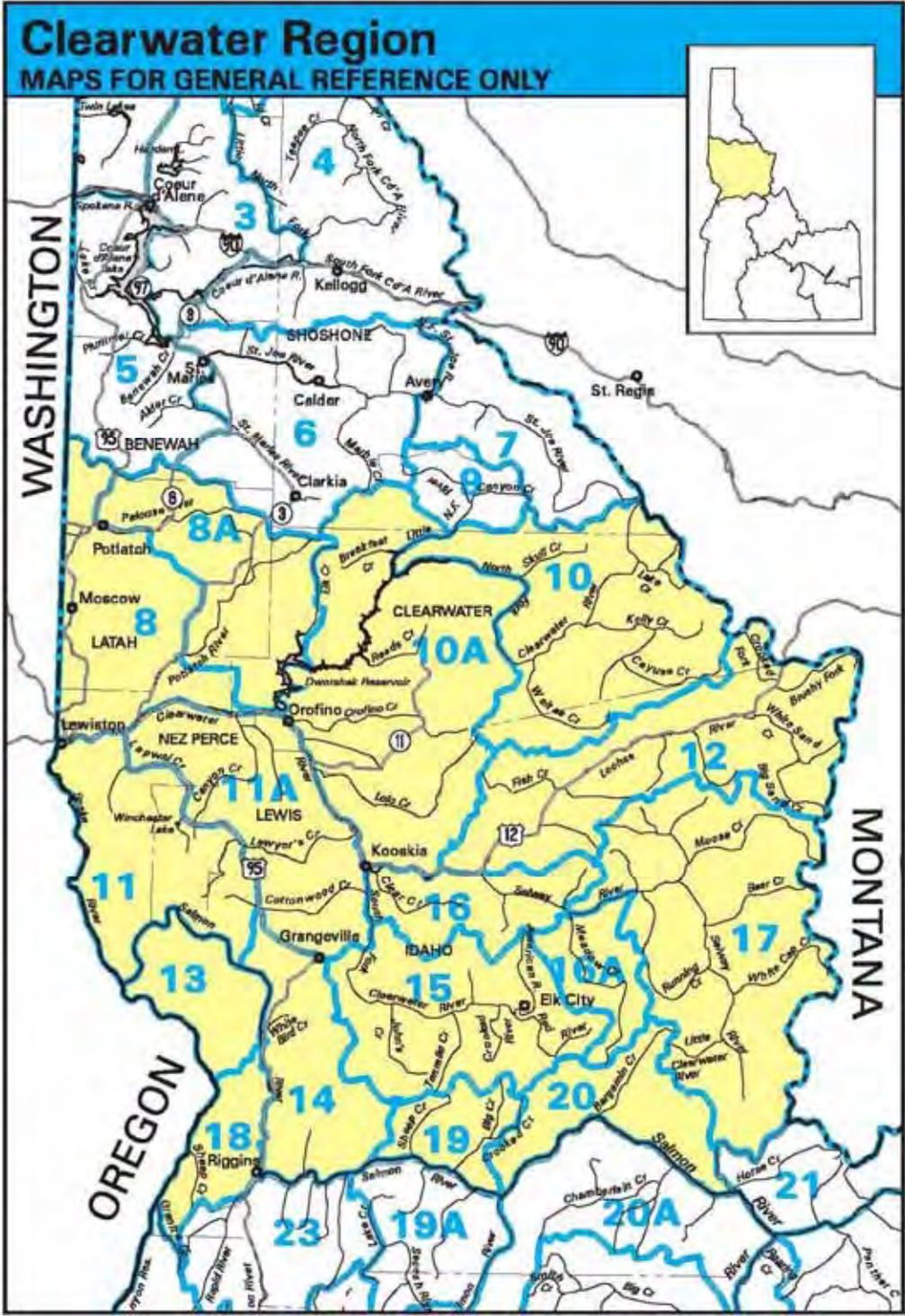


FIGURE 1. Location of GMU's 10, 12, 16A, 17, 19, and 20 in Idaho.

Predation Management Plan for the Middle Fork Elk Zone

February 2014



Idaho Department of Fish and Game

TABLE OF CONTENTS

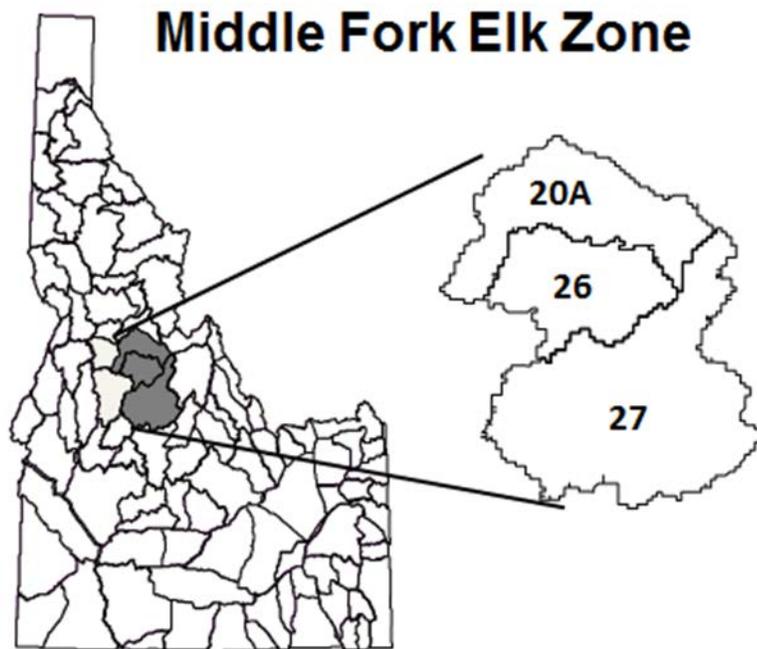
INTRODUCTION	1
DEFINITION OF PROBLEM.....	1
ELK POPULATION OBJECTIVES AND CURRENT STATUS.....	2
Background – Middle Fork Elk	4
Habitat Potential.....	4
Annual Survival of Elk	5
Cause-specific Mortality of Elk	5
EFFORTS TO ADDRESS MIDDLE FORK ZONE ELK DECLINE	5
Changes in Elk Habitat	5
Changes in Elk Hunting Seasons and Harvest Strategies	6
Black Bear and Mountain Lion Populations and Harvest.....	7
Wolf Population Size	7
Wolf Harvest.....	9
PREDATION MANAGEMENT PROGRAM	10
Proposed Actions	10
OBJECTIVE AND MEASURES OF SUCCESS.....	10
MONITORING.....	11
Elk.....	11
Bears and Mountain Lions	11
Wolves	11
Budget.....	12
RISK ASSESSMENT.....	12
Predator Population.....	12
Prey Populations	13
Wildlife-Associated Recreation Opportunity	13
Management Actions in Federally-designated Wilderness.....	13
LITERATURE CITED	14

LIST OF TABLES

Table 1. Population objectives and status of Middle Fork Zone elk 1989 – 2011 (elk sightability surveys).....	2
Table 2. Middle Fork Elk Zone harvest statistics, 2003-2012.....	6
Table 3. Human-caused mortality in the MFZ since 2009-2010.....	9

LIST OF FIGURES

Figure 1. Total number of cow elk in the Middle Fork Zone, 1989-2011.....	3
Figure 2. Total number of antlered elk in the Middle Fork Zone, 1989-2011. Prior to the adoption of the 2014-2024 Elk Management Plan, the population objectives for males was 950-1,550 and adult males was 600-900 (IDFG 1999). IDFG adjusted this objective to better reflect realistic potential for population growth over the scope of the 2014-2023 elk plan.	3
Figure 3. Juveniles:100 females in Middle Fork Elk Zone, 1989-2011.	4
Figure 4. Approximate extent of detected wolf pack activity in the MFZ, 2011-2012.	8



INTRODUCTION

Consistent with the Fish and Game Commission's (Commission) "Policy for Avian and Mammalian Predation Management (IDFG 2000)," this management plan identifies actions and objectives to stabilize and recover elk populations in the Middle Fork Zone (MFZ), and identifies approaches to monitor effects of these actions on elk and predator populations. Most of the MFZ is comprised of the Frank Church River of No Return Wilderness and in federal ownership, managed by the U. S. Forest Service (USFS). Actions will be taken in consideration of congressional wilderness designation and in conjunction with state management plans for individual species (gray wolf [*Canis lupus*], black bear [*Ursus americanus*], mountain lion [*Puma concolor*], and elk [*Cervus elaphus*]) to ensure species management objectives are met.

DEFINITION OF PROBLEM

Total elk numbers in the MFZ declined from 7,485 to 6,958 (-7%) from 2002 to 2006, and then to 4,229 by 2011 (an additional 39% for a total loss of 43% since 2002). Cow elk and bull elk numbers in the MFZ have declined 35% and 45%, respectively, between the 2006 and 2011 aerial surveys and are below population management objectives. The ratio of calves to cow elk during in the 2011 winter survey was less than 13 calves per 100 cows, suggesting further decline beyond 2011.

This low level of reproductive success is well below that needed to recover the herd, and at its current level, the elk population will continue to decline. Based on research on causes of elk mortality conducted in the elk management zones immediately adjacent to MFZ to the north

(Lolo and Selway) and to the south (Sawtooth), wolves are likely a major source of juvenile and female elk mortality especially during winter, thus reducing the recruitment of juveniles into the herd and preventing the female elk component of the population from reaching management objectives (Pauley and Zager 2011). Based on population modeling, the MFZ elk population is expected to continue to decline at 3 to 7% annually if predation rates are not reduced.

ELK POPULATION OBJECTIVES AND CURRENT STATUS

Management objectives for elk in the MFZ call for maintaining 3,850 – 5,750 female elk and 690 - 1,030 male elk, of which 390 - 810 are adult males (defined as branched-antler bulls during winter) (IDFG 2014). The most recent survey (2011) indicated that all components of the elk population were below population objectives (Table 1, Figs. 1-2). The cow to calf ratio in the MFZ declined substantially after 1995 (Fig. 3).

Table 1. Population objectives and status of Middle Fork Zone elk 1989 – 2011 (elk sightability surveys).

Objective ^a	F	M	Adult M	M:100 F	Ad M: 100 F
	3,850-5,750	690-1030	390-810	25-29	14-18
Year					
1989	4,225	933	543	22.1	12.9
1992	5,525	1,217	691	22.0	12.5
1995	6,365	1,314	865	20.6	13.6
1999 ^b	6,383	855	619	13.4	9.7
2002	4,613	875	475	19.0	10.3
2006	5,137	834	450	16.2	8.8
2011	3,341	462	276	13.8	8.3

^a Prior to the adoption of the 2014-2024 Elk Management Plan, the population objectives for males was 950-1,550 and adult males was 600-900. IDFG adjusted this objective to better reflect realistic potential for population growth during this 10-year period.

^b Values for GMU 26 portion of this estimate based on a partial survey.

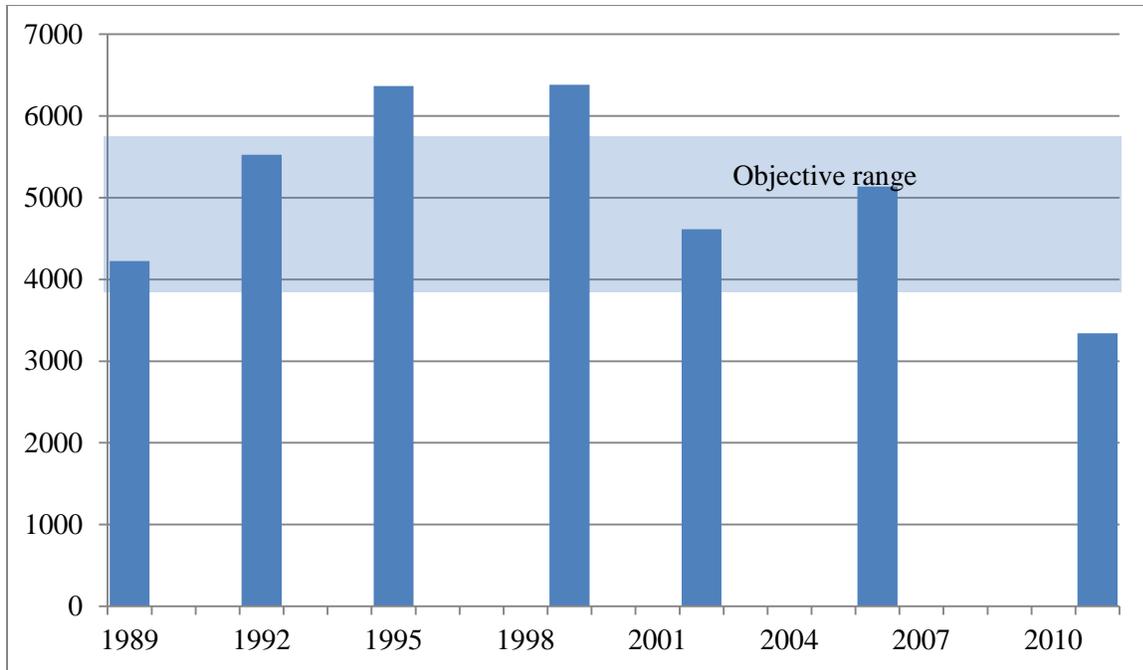


Figure 1. Total number of cow elk in the Middle Fork Zone, 1989-2011.

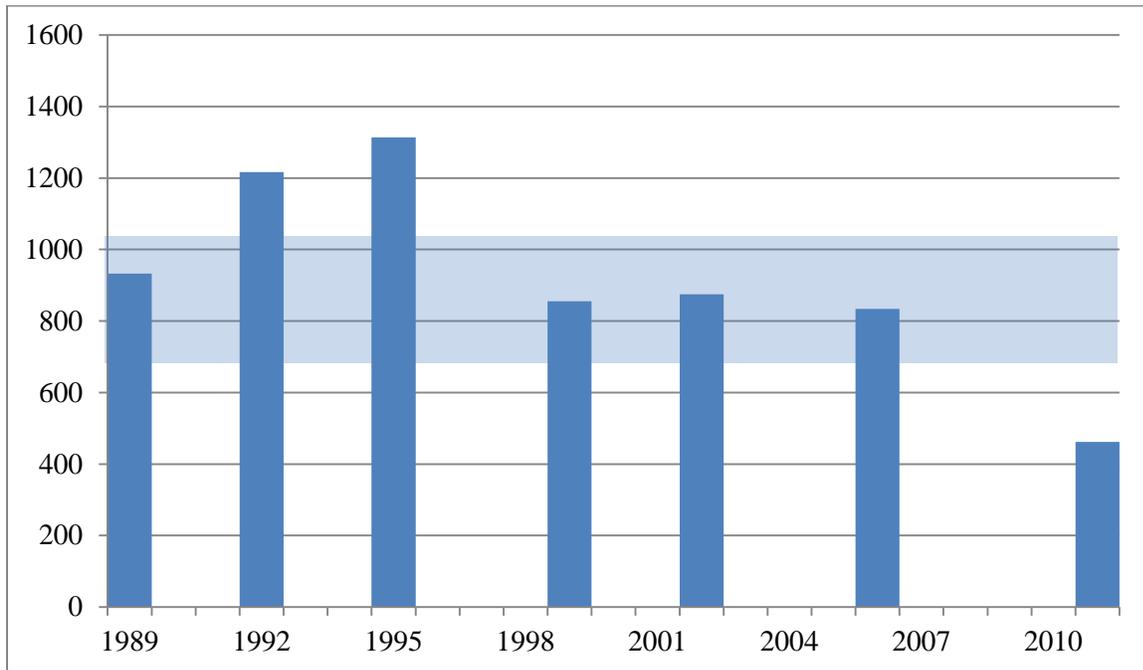


Figure 2. Total number of antlered elk in the Middle Fork Zone, 1989-2011. Prior to the adoption of the 2014-2024 Elk Management Plan, the population objectives for males was 950-1,550 and adult males was 600-900 (IDFG 1999). IDFG adjusted this objective to better reflect realistic potential for population growth over the scope of the 2014-2023 elk plan.

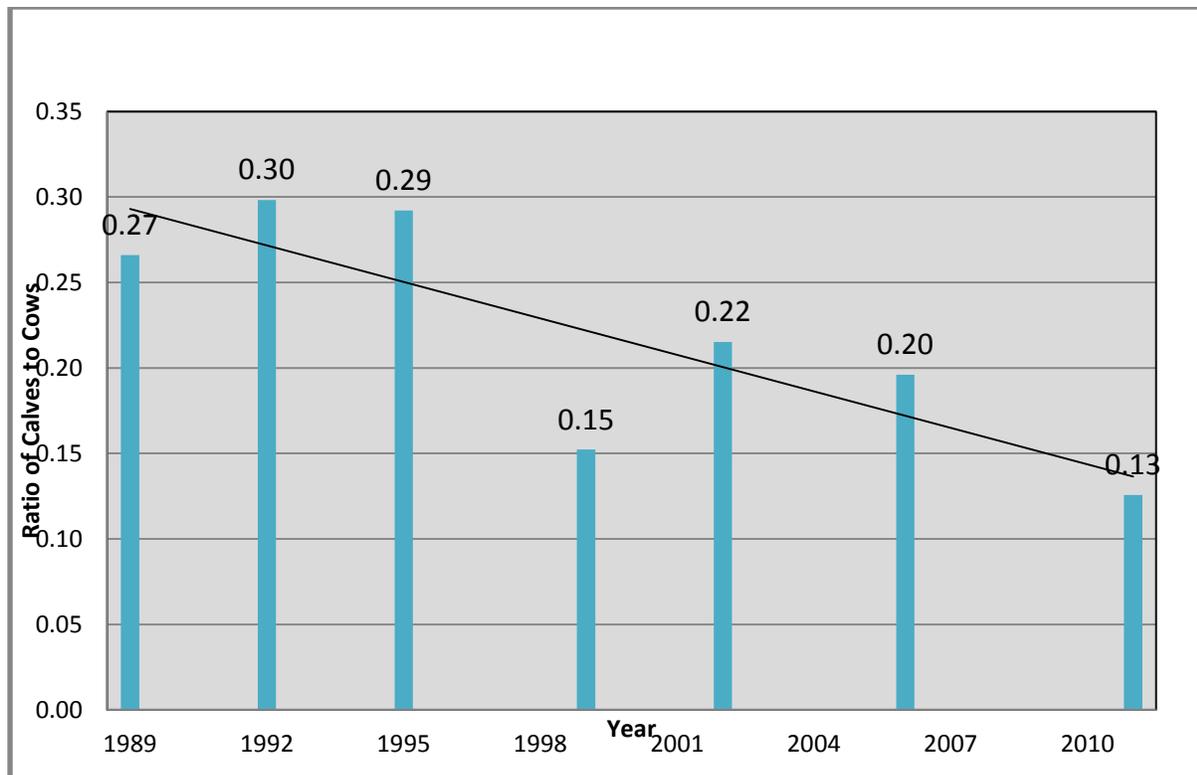


Figure 3. Juveniles:100 females in Middle Fork Elk Zone, 1989-2011.

Background – Middle Fork Elk

The Idaho Department of Fish and Game (IDFG) has defined some movement patterns of elk in the MFZ via radio-telemetry of elk calves. This information, combined with radio-telemetry studies of elk in the adjacent zones to the north and south of the MFZ, and historical observations within the MFZ, indicates that greater than 60% of elk in the MFZ remain resident within the zone, occupying higher elevation ranges during summer and moving to lower elevations along the Middle Fork Salmon River, main Salmon River and major tributaries during winter. Population objectives were established based on habitat potential, harvest opportunity, and moderate predation rates (IDFG 2014).

Habitat Potential

Pregnancy rates and body condition of females are indicators of carrying capacity (Murphy et al. 2011). In addition, forage quality and its effect on animal condition regulate elk population vital rates, and recruitment rates in particular (Cook 2002, Cook et al. 2004). Higher quality forage typically promotes higher recruitment rates, while in a habitat-limited situation, rates decline in response to lower or declining forage conditions.

Granitic and weathered volcanic formations underlying the MFZ provide fewer nutrients, and lower precipitation in the MFZ limits vegetative productivity. Similar to the situation in the Lochsa and Lolo areas (to the north), elk habitat quality in the MFZ has declined in general since

the 1980s through the early 2000s due to a lack of disturbance (fires), and has been a factor contributing to population decline.

Recent fires in the MFZ have provided some relief from long-term habitat declines. Perimeters of fires occurring since 2000 encompass >400,000 acres, accounting for roughly 20% of the area. In general, large-scale wildfires promote increased forage production and forage quality, particularly on summer ranges. A significant acreage of wildfire in the MFZ has occurred on winter and transition range; however, on some winter ranges there is potential for reduced forage quantity and quality as a consequence of increased prevalence of invasive noxious weeds and other species with lower or no nutritional value.

Annual Survival of Elk

Elk population growth rates are sensitive to adult female survival, and populations that are stable or increasing typically exhibit female survival rates $\geq 90\%$ (Eberhardt 1985). Cow survival rates averaged 81% in the nearby Lowman area, 2008-2012; and 83% in the North Fork Clearwater River drainage, 2009-2012 (Pauley et al. 2012, IDFG unpublished data 2014).

Poor juvenile survival also contributes substantially to population decline (Gaillard et al. 1998, Raithel 2005). The most recent mid-winter estimate of less than 13 calves per 100 cows is inadequate to maintain a population given observed cow elk survival rates. Female and juvenile elk survival rates appear inadequate to stabilize or provide growth of the elk population, preventing it from reaching management objectives within the MFZ.

Cause-specific Mortality of Elk

IDFG has collected data through the use of radio-collars regarding the causes of elk mortality between 2006 and 2012 from the Sawtooth, Lolo, and Selway Zones, which are located immediately south and north of the MFZ. Legal harvest was documented as the primary cause of mortality for adult male elk, while wolf predation and malnutrition were documented as the leading causes of mortality for both females and calves \geq six months (Pauley and Zager 2011). Neonate elk (< 6 months) are killed primarily by predation from bears and lions (Schlegel 1986, Zager and White 2003), although predation by wolves, malnutrition, and other causes can be important factors (Zager et al. 2007).

EFFORTS TO ADDRESS MIDDLE FORK ZONE ELK DECLINE

Changes in Elk Habitat

Most of the MFZ is comprised of the Frank Church River of No Return Wilderness and in federal ownership, managed predominately by the USFS. Habitat alteration in this area is largely in the form of natural disturbance such as wildfire. Approximately 20% of the MFZ has burned in wildfires since 2000. However, colonization of the Wilderness by invasive plant species in recent years is an important factor in the deterioration of elk habitat in some areas. IDFG will make recommendations regarding invasive plant control and other habitat-related issues to the USFS consistent with the directives of the 1980 federal wilderness designation and interagency

agreements. IDFG will also continue to evaluate appropriate measures for habitat management on the relatively small acreage of parcels it owns in the MFZ.

Changes in Elk Hunting Seasons and Harvest Strategies

In response to declines in elk numbers, especially bull elk, IDFG implemented caps on the A and B zone tags in the MFZ in 2000 and restricted take to a smaller segment of the elk population (only bull elk with at least a brow tine) in GMU 27 in 2001. Antlerless elk hunting was reduced over time and completely eliminated in the MFZ in 2011 (Table 2).

Table 2. Middle Fork Elk Zone harvest statistics, 2003-2012.

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Antlerless harvest	110	73	78	119	78	42	67	57	0	0
'A' Tag	71	72	78	119	77	42	67	55	0	0
'B' Tag	39	1	0	1	1	0	0	2	0	0
CH Tag	0	0	0	0	0	0	0	0	0	0
Antlered harvest	309	307	355	419	296	295	250	158	145	155
'A' Tag	75	110	76	112	93	61	65	50	38	43
'B' Tag	234	197	279	307	203	234	185	108	107	112
CH Tag	0	0	0	0	0	0	0	0	0	0
Hunter numbers	1,878	1,841	1,678	1,611	1,512	1,752	1,511	1,133	821	757
'A' Tag	752	782	678	647	654	706	588	471	285	197
'B' Tag	1,126	1,059	990	964	858	1,046	923	662	536	560
CH Tag	0	0	10	0	0	0	0	0	0	0
6+ points (%)	39	36	47	43	40	42	49	56	44	50

Black Bear and Mountain Lion Populations and Harvest

Spring and fall bear seasons in the MFZ were relatively conservative in the late 1980s and early 1990s, consisting of a standardized season of April 15 to June 15 in spring and September 15 to October 31 in fall. Lion seasons ran from September 15 to March 31. Only 1 bear and 1 lion could be taken in a calendar year.

Between fall 1999 and spring 2001, the Commission made incremental changes to bear and lion seasons and bag limits to address declining elk recruitment in the MFZ. Bear seasons were expanded to August 30 to November 18 in fall and April 1 to June 30 in spring. Lion seasons were expanded to August 30 through April 30. Extra bear and lion tags were allowed, along with discounted non-resident bear and lion tags. Non-resident deer and elk tags could also be used on bear and lions.

These changes resulted in a doubling of black bear harvest by 2002, and black bear harvest has since remained at these higher levels. The management objective for bears in the MFZ (bear data analysis unit 3B) is to increase harvest from a light to moderate harvest regime (IDFG 1998). Despite the higher harvest levels since 2002, the bear population in the MFZ continues to exhibit characteristics of a lightly harvested population.

By contrast, mountain lion harvest demonstrated an initial increase, and then a declining trend in harvest after 2000. This pattern occurred simultaneously over most of Idaho. Potential factors include a reduced lion population driven by a declining prey base for this obligate predator, and a decline in participation by hound hunters (concerns with turning dogs loose in wolf country). Although alternate prey, primarily white-tailed (*Odocoileus virginianus*) and mule deer (*O. hemionus*), are available to lions in these GMUs, whitetails are uncommon and mule deer occur at moderate densities.

The current lion harvest (average of 10 lions/year, 2011 – 2013) is below the objective described in the Idaho Mountain Lion Plan (IDFG 2002) for a harvest of 15 or more lions annually from the Warren Data Analysis Unit, which also includes GMUs 19A and 25. This DAU includes some of the oldest mountain lions in Idaho, with 55% of the male harvest constituted of lions 5 years of age or older.

Wolf Population Size

Radio-telemetry, non-invasive genetic sampling, hunter observation and harvest information (e.g., location and number observed by hunters, location and age-class data obtained from harvested wolves) provide insight into pack activity in the MFZ. Based on this information, IDFG has documented 6 to 8 resident packs in the MFZ in recent years (2008 – 2012), and an additional 2-3 packs whose territories include significant area within the MFZ (Fig. 4). However, additional packs that have not been detected may use the MFZ, and annual minimum population estimates generated for such a vast and remote back-country area should be treated as conservative estimates.

To comply with federal post-delisting monitoring requirements, IDFG develops a minimum population estimate for wolves by using information based on documented packs, estimated pack size, number of wolves documented in small groups not considered packs, and a percentage of the population expected to be lone wolves. The formula is presented as:

$$[(\# \text{ Wolves in known packs with complete counts}) + (\# \text{ Packs with incomplete counts} * \text{mean pack size}) + (\# \text{ Wolves in other documented groups})] * (\text{lone wolf factor})$$

This minimum population estimate is calculated at the end of the calendar year, during the hunting and trapping seasons. It is more useful to management, however, to calculate this estimate the following summer, after harvest has concluded and packs have demonstrated success in recruitment of pups.

Given a *summer* mean pack size of 9.2 wolves per pack (IDFG unpublished data 2012), an additional 12.5% lone wolf factor (see Holyan et al. 2013), 9 packs represent approximately 93 wolves present in the MFZ during summer.

Wolf Harvest

The state is divided into wolf zones based on current wolf densities and distribution, elk zones and prey base, livestock conflict areas, ecological or administrative similarities, and linkage concerns. The Middle Fork Wolf Zone is identical to the Middle Fork Elk Zone.

During the first Idaho wolf hunting season in 2009, IDFG developed harvest limits for individual wolf zones as well as a statewide limit. Seasons closed in individual zones when harvest limits were met, or the end of the established season date, whichever occurred first. A harvest limit of 17 was adopted for the MFZ for the 2009-10 season (this was reached January 31, 2010); no harvest limits were deemed necessary for subsequent years. Hunting and trapping are the primary causes of human-caused mortality in the MFZ (Table 3).

Table 3. Human-caused mortality in the MFZ since 2009-2010.

Biological Year ^a	Hunting	Trapping	Other Human-Caused Mortality ^c	Total
2009-2010	16	0	4	20
2010-2011	0	0	0	0
2011-2012	27	12	1	40
2012-2013	6	10	0	16
2013 - 2014 ^b	11	2	9	22

^a May 1 – April 30

^b Through January 31, 2014 only

^c Includes other legal kills, illegal kills, control actions, etc.

IDFG has incrementally increased wolf hunting and trapping opportunity under an adaptive framework consistent with Commission direction. The hunting season ran from 30 August through 31 March for the first 3 seasons and was extended to a 30 June closure beginning in 2013-14. Trapping was permitted 15 November to 31 March beginning with the 2011-12 season. Hunters and trappers can use up to 5 wolf tags in the MFZ (each method, plus hunting tags may be used for trapped wolves). Additionally, non-resident elk and deer tags may be used instead for taking a bear, lion, or wolf if that season is open.

PREDATION MANAGEMENT PROGRAM

PROPOSED ACTIONS

Regulated harvest by licensed hunters is IDFG's preferred tool for reducing black bears and mountain lions in the MFZ. IDFG will continue to support longer seasons and additional tags in the MFZ for managing bear and lion to improve elk survival. IDFG plans no additional actions beyond regulated harvest for bear and mountain lion management.

Regulated harvest by licensed hunters and trappers is IDFG's preferred tool for reducing wolves in the MFZ. When regulated harvest, despite changes to seasons, bag limits, and regulations, is insufficient to achieve wolf reduction in the MFZ, and consistent with the federal wilderness designation of most of the MFZ, IDFG will approach management from a "minimum tool" perspective, initially using one or more wilderness trappers on foot or horseback to remove wolves from the MFZ.

Wolf removal rates of 29% or less typically do not cause any short-term changes in wolf abundance (Adams et al. 2008). Wolf populations tend to compensate for low removal rates, potentially within a year. Where higher levels of removal occur and wolf populations decline, the wolf population would be expected to return to pre-removal levels rapidly once removals end (National Research Council 1997: Table 3.1). Consequently, after a wolf population is reduced to a desired level, it is necessary to sustain a removal level during subsequent years to maintain reduced wolf abundance. Proposed future management actions will be designed to maintain approximately 40% of the existing wolf population in the MFZ.

Wolf management in the MFZ is extremely challenging considering the remote country, rugged terrain, and limited access. Consequently, hunting and trapping pressure is lower than front country areas that are easier to access and travel. Any reduction in the MFZ wolf population will likely take longer than most other zones. Management will be necessarily adaptive, relying upon monitoring to determine the appropriate management. IDFG will monitor legal harvest and adjust future efforts accordingly.

OBJECTIVE AND MEASURES OF SUCCESS

The objective of the Predation Management Plan is to affect an increase in elk survival and elk numbers in the MFZ to move the population towards stabilization and eventual recovery. To achieve this objective, IDFG seeks to reduce predator populations without affecting their viability. IDFG will manage wolf numbers to 40% of the 2012 population, from a summer population of approximately 93 wolves to approximately 35-40 wolves. Success will be

measured by comparing elk status in relation to IDFG 2014 elk plan population objectives and consistency with species management plans for black bear and mountain lion, and the Idaho Wolf Conservation and Management Plan (Idaho Legislative Wolf Oversight Committee 2002).

MONITORING

Monitoring is a key component of any predation reduction plan and integral to adapting and refining management. Both predators and prey must be monitored to provide an adaptive framework for decisions.

ELK

Harvest characteristics will continue to be monitored annually through a mandatory hunter report card. A zone-wide elk survey was conducted in the MFZ in 2011 and a subsequent survey is planned after 5 years, during winter 2016. Recruitment will be indexed through estimation of calf:cow ratios biennially.

BEARS AND MOUNTAIN LIONS

IDFG will monitor black bear, mountain lion, and wolf populations through required harvest checks and Big Game Mortality Report forms. These forms are required for each successful hunter and for other discovered mortality and provide detailed information for each individual animal harvested regarding animal age, sex, location, and condition. Forms for wolves also include information regarding observation of other wolves. Harvest checks involve the extraction of a tooth for aging, collection of DNA, and attachment of an identification tag to each pelt. These data provide population trends regarding male/female ratios and age class distribution of the harvest.

WOLVES

In addition to measures outlined above for bears and lions, IDFG will continue statewide monitoring of the wolf population to ensure compliance with post-delisting population criteria and monitoring requirements. IDFG will estimate a minimum number of wolves and breeding pairs on an annual basis from observations of unmarked and radio-collared packs, and wolf tracking and aerial surveys.

Depending on the efficacy of maintaining radio-collared animals in the MFZ, IDFG may also conduct non-invasive genetic surveys of historic and predicted rendezvous sites (Ausband et al. 2010) to assess pack presence, size, recruitment, and rate of (reported) human-caused mortality. Additional methods may include conducting howl box surveys to verify presence or absence (Ausband et al. 2011), using trail cameras to verify production, and linking harvest data to specific packs.

BUDGET

The funds required to implement actions in this plan are available as part of larger, ongoing IDFG programs. Aerial surveys as listed are funded through statewide ungulate monitoring budgets. Funds for these efforts come from a combination of Pittman-Robertson funds, federal wolf appropriations, and IDFG license dollars. Only license funds would be used for lethal removal of wolves in the MFZ.

RISK ASSESSMENT

PREDATOR POPULATION

IDFG's actions under this plan will be limited to black bear, mountain lions, and wolves.

Bear season changes and associated actions that were implemented previously were intended to increase bear harvest rates to meet a "moderate" harvest goal. However, "light" harvest rates continue to be documented, and the geographic ruggedness and isolation of this area may make a moderate harvest rate unattainable even with liberal hunting seasons.

Declines in elk numbers were followed by declines in numbers of mountain lions, which in turn led to lower hunter participation and harvest rates (White 2010). Lion harvest remains low and more liberal lion seasons are unlikely to reduce lion populations substantially.

As of December 31, 2012, there were ≥ 117 wolf packs and ≥ 35 documented breeding pairs in Idaho (Holyan et al. 2013). Of the 117 packs documented in 2012, 111 documented packs were completely outside the MFZ and would not be affected by actions authorized under this predation management plan. None of the 35 breeding pairs documented during 2012 would be affected by the proposed actions. More than 600 wolves reside in areas of Idaho outside the MFZ proposed action.

Of note, the MFZ was the site of the initial 35 wolves released in Idaho during 1995 and 1996. Idaho's current wolf population is the result of these releases, dispersal from releases in Wyoming the same years, and natural colonization from established populations in Montana and Canada. A majority of introduced wolves established territories outside the MFZ, and most wolves in Idaho currently exist outside the MFZ. Potential emigration from these areas into the MFZ and wolf population resiliency in general make it very unlikely that reductions proposed under this plan would present any significant short- or long-term risk to the persistence of wolves in the Frank Church River of No Return Wilderness, MFZ, or overall wolf population viability. Wolf population reduction in the MFZ will not affect the ability to maintain Idaho's wolf population well above the recovery criteria of 15 breeding pairs and 150 wolves statewide.

In summary, these described management efforts are intended to help improve elk survival in the MFZ and will not affect the viability of the resident wolf, bear, and mountain lion populations within the MFZ nor adjacent zones.

PREY POPULATIONS

Elk will be the primary species benefitting from the proposed actions in this plan. Mule deer, bighorn sheep, and other prey may benefit as well.

WILDLIFE-ASSOCIATED RECREATION OPPORTUNITY

Elk have been managed for hunting and viewing by the public since the 1950s in the MFZ. The participation in hunting peaked in the 1990s as elk reached population levels that were meeting or exceeding IDFG objectives. Since that time, calf recruitment has steadily declined along with the total elk population. IDFG has substantially reduced elk hunting opportunity in the MFZ since 2000. During the past 10 years, the number of elk hunters in the MFZ declined from 2,105 to 797, a loss of 62% participation.

Implementation of actions designed to reduce impacts of predation on elk may result in a subsequent increase in opportunities for sportsmen and for other wildlife-associated recreationists whose focus is elk. The continued presence of wolves, black bear, and mountain lions in this area also provides an opportunity for hunting, trapping (in the case of wolves), and viewing (directly or indirectly), which maintains the wilderness character and values of the MFZ. These opportunities will continue in a sustainable fashion as IDFG manages predation on elk consistent with the objectives of this plan.

MANAGEMENT ACTIONS IN FEDERALLY-DESIGNATED WILDERNESS

Most of the MFZ lies within the federally designated Frank Church River of No Return Wilderness. IDFG will consider the values underlying the Central Idaho Wilderness Act of 1980 as they apply to its actions in the Frank Church River of No Return Wilderness. IDFG will also evaluate the “minimum tool” concept for performance of additional agency actions in the Frank Church River of No Return Wilderness, should they be needed to reach population objectives under this plan.

LITERATURE CITED

- Adams, L.G., R.O. Stephenson, B.W. Dale, R. T. Ahgook, and D. J. Demma. 2008. Population dynamics and harvest characteristics of wolves in the Central Brooks Range, Alaska. *Wildlife Monographs* 170.
- Ausband, D. E., M. S. Mitchell, K. Doherty, P. Zager, C. M. Mack, and J. Holyan. 2010. Surveying predicted rendezvous sites to monitor gray wolf populations. *Journal of Wildlife Management* 74:1043–1049.
- Ausband, D. E., J. Skrivseth, and M. S. Mitchell. 2011. An automated device for provoking and capturing wildlife calls. *Wildlife Society Bulletin* 35:498-503.
- Ausband, D. E., L. N. Rich, E. M. Glenn, M. S. Mitchell, P. Zager, C. M. Mack, D. A. W. Miller, and B. B. Ackerman. In review. Monitoring wolf populations using multiple survey methods. *Journal of Wildlife Management*.
- Cook, J. G. 2002. Nutrition and food. Pages 259–349 *in* D. E. Toweill and J. W. Thomas, editors. *North American elk: ecology and management*. Smithsonian Institution Press, Washington, D.C., USA.
- Cook, J. G., B. K. Johnson, R. C. Cook, R. A. Riggs, T. Delcurto, L. D. Bryant, and L. L. Irwin. 2004. Effects of summer-autumn nutrition and parturition date on reproduction and survival of elk. *Wildlife Monographs* 155.
- Eberhardt, L. L. 1985. Assessing the dynamics of wild populations. *Journal of Wildlife Management* 49:997–1012.
- Gaillard, J. M., M. Festa-Bianchett, and N. G. Yoccoz. 1998. Population dynamics of large herbivores: variable recruitment with constant adult survival. *Trends in Ecology and Evolution* 13:58–63.
- Holyan, J., J. Husseman, J. Struthers, and B. Thomas. 2013. 2012 Idaho wolf monitoring progress report. Idaho Department of Fish and Game, Boise, Nez Perce Tribe Wolf Recovery Project, Lapwai, USA.
- Idaho Department of Fish and Game. 1998. Black bear management plan 1999–2010: status and objectives of Idaho’s black bear resource. Idaho Department of Fish and Game, Boise, ID.
- Idaho Department of Fish and Game (IDFG). 1999. Idaho elk management plan: status and objectives of Idaho’s elk resources. Idaho Department of Fish and Game, Boise, USA.
- Idaho Department of Fish and Game (IDFG). 2000. Policy for Avian and Mammalian Predation Management web site. <<http://fishandgame.idaho.gov/public/wildlife/?getPage=331>>. Accessed 6 February 2014.

- Idaho Department of Fish and Game (IDFG). 2002. Mountain lion management plan 2002–2010. Idaho Department of Fish and Game, Boise, ID.
- Idaho Department of Fish and Game. 2014. Idaho Elk Management Plan. Idaho Department of Fish and Game. Boise, ID.
- Idaho Legislative Wolf Oversight Committee 2002. Idaho wolf conservation and management plan. Boise, ID.
- Murphy, K. M., M. S. Nadeau, and T. K. Ruth. 2011. Cougar-prey relationships. Pages 41–70 *in* J. A. Jenks, editor. Managing cougars in North America. Jack H. Berryman Institute, Utah State University, Logan, USA.
- National Research Council. 1997. Wolves, bears, and their prey in Alaska. National Academy Press, Washington, D.C., USA.
- Pauley, G. R., and P. Zager. 2011. Effects of wolf predation on elk populations. PR11 S11 9-13 Idaho Department of Fish and Game. Boise, USA.
- Pauley, G.R., P. Zager, and L. Bischoff. 2012. Effects of wolf predation on elk populations. PR12 S11 9-13 Idaho Department of Fish and Game. Boise, USA.
- Raithel, J. D. 2005. Impact of calf survival on elk population dynamics in west-central Montana. University of Montana, Missoula, USA.
- Schlegel, M. W. 1986. Movements and population dynamics of the Lochsa elk herd. Factors affecting calf survival in the Lochsa elk herd. Federal Aid in Wildlife Restoration, Job Completion Report, Project W-160-R, Subproject 38. Idaho
- White, C. 2010. Mountain lion. Job Progress Report, Project W-170-R-33, Study I: Big game population status, trends, use, and associated habitat studies. Idaho Department of Fish and Game, Boise, USA.
- Zager, P., and C. White. 2003. Elk ecology, study IV: Factors influencing elk calf recruitment, federal aid in wildlife restoration, job progress report, project W-160-R-30, subproject. 31. Boise, Idaho: Idaho Department of Fish and Game.
- Zager, P., G. Pauley, M. Hurley, and C. White. 2007. Statewide elk ecology. Progress Report, Project W-160-R-34. Idaho Department of Fish and Game, Boise, USA.

Predation Management Plan

Panhandle Elk Zone

April 2014



Idaho Department of Fish and Game

600 S. Walnut Street

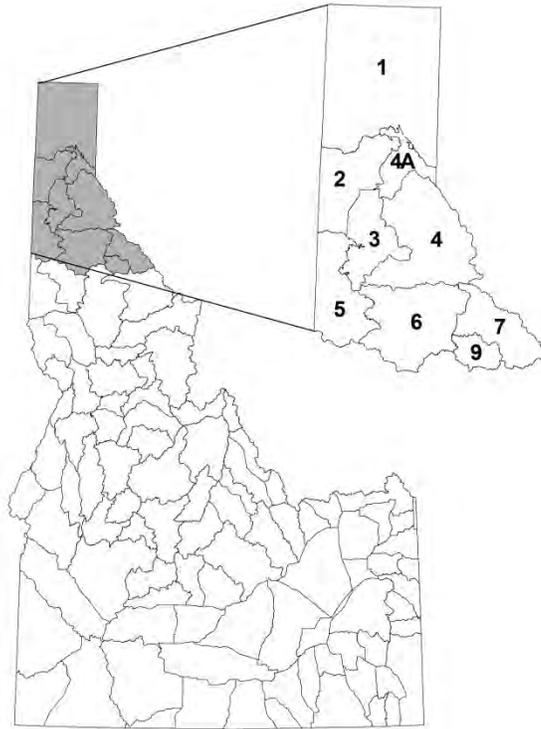
Boise, ID 83707

Table of Contents

INTRODUCTION.....	4
DEFINITION OF PROBLEM	4
ELK POPULATION OBJECTIVES	5
ELK POPULATION STATUS	6
Population Size	6
Survival Rates of Cow Elk	7
Pregnancy Rates.....	7
Recruitment	8
Cause-specific Mortality of Elk.....	8
Elk population summary	9
HABITAT POTENTIAL	9
EFFECTS OF WEATHER	9
EFFORTS TO ADDRESS PANHANDLE ZONE ELK DECLINE.....	10
Changes in Elk Hunting Seasons and Harvest Strategies	10
Changes in Black Bear Hunting Seasons and Harvest	10
Changes in Mountain Lion Hunting Seasons and Harvest.....	11
Changes in Wolf Hunting Seasons and Harvest	12
PREDATION MANAGEMENT PROGRAM	13
PROPOSED ACTIONS	13
Black Bears.....	14
Mountain Lions	14
Wolves	14
OBJECTIVES AND MEASURES OF SUCCESS.....	15
MONITORING.....	16
Elk	16
Black Bear, Mountain Lion, and Wolves	16
BUDGET.....	16
RISK ASSESSMENT.....	17
PREDATOR POPULATIONS	17
PREY POPULATIONS	17
WILDLIFE-ASSOCIATED RECREATION OPPORTUNITY.....	17

LITERATURE CITED 18

PANHANDLE ELK ZONE



INTRODUCTION

Consistent with the Fish and Game Commission's Policy for Avian and Mammalian Predation Management (IDFG 2000), this management plan identifies actions and objectives to stabilize and recover elk populations in a portion of the Panhandle Elk Management Zone (PEZ) and identifies approaches to monitor effects of these actions on elk and predator populations. Most of the land within the affected area is under federal ownership and managed by the Idaho Panhandle National Forest (IPNF). Actions will be taken that are consistent with Forest Plan objectives and in conjunction with state management plans for gray wolves (*Canis lupus*), black bears (*Ursus americanus*), mountain lions (*Puma concolor*), and elk (*Cervus elaphus*) to ensure that species' management objectives are met.

DEFINITION OF PROBLEM

The PEZ is one of the largest zones in the state, including 9 Game Management Units (GMUs) and encompassing 7,779 square miles. Land ownership patterns, the influence of weather,

habitat conditions, and predator densities vary within the PEZ, resulting in different elk population levels in geographically distinct portions of the zone.

Practical considerations (primarily short periods during which surveys can be flown, heavy cover and large areas with dispersed elk herds) disallow a zone-wide population estimate. Elk problems are not ubiquitous in the PEZ. Harvest data and surveys of calf recruitment suggest few problems in GMUs 1, 2, 3, and 5, areas of concern in GMUs 4, 4A, and much of GMU 6, but substantial problem in GMUs 7 and 9, and the eastern portion of GMU 6. As such, at this time the remainder of this predation management plan will focus in GMUs 6, 7, and 9, including portions of the St. Joe and Little North Fork Clearwater River drainages.

Elk numbers declined in the St. Joe Elk Bellwether Area from 3,751 to 3,256 (- 13%) from 2006 to 2009, and then to 1,263 by 2012 (a further 61% for a total 66% decline from 2006 to 2012). The ratio of calves to cow elk during mid-winter surveys since 2012 has ranged from 12 to 22 per 100. Modeling indicates continued declines through 2014.

Based on research on causes of elk mortality conducted in the elk management zones immediately adjacent to PEZ to the south (Lolo and Selway), wolves are likely a major source of juvenile and female elk mortality especially during winter, thus reducing the recruitment of juveniles into the herd and preventing the female elk component of the population from reaching management objectives (Pauley and Zager 2011).

ELK POPULATION OBJECTIVES

Differences in elk herds within the PEZ were reflected in different objectives in the 2014 Elk Management Plan (IDFG 2014). GMU-specific objectives were developed, based on groupings of GMUs with similar elk population status (Table 1), and growth rates felt to be realistically attainable under good conditions. A 10-year growth objective of 40% was identified for GMUs 6, 7, and 9.

Table 1. GMU-specific objectives for elk in the Panhandle Zone from 2014 Elk Management Plan.

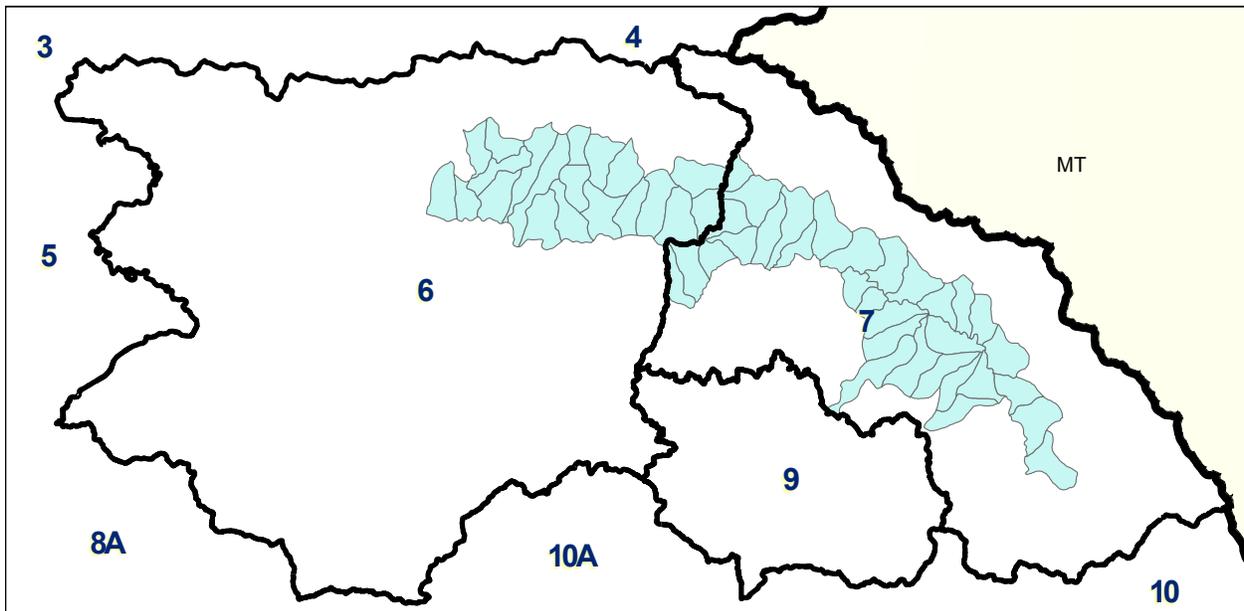
GMU	Population Trend		2023 Growth Objectives
	Current Status	Objectives	
1	Little change to increasing	Stable to increase	Up to 25% more elk
2,5	Increasing	Stabilize to decrease depending on human population growth/agricultural and depredation issues	Within 10% of existing levels
3,4,4A	Little change	Stabilize	Up to 20% more elk
6,7,9	Decreasing	Increase	Up to 40% more elk

ELK POPULATION STATUS

Population Size

Funding and time constraints do not allow consistent monitoring of elk populations on a rotational GMU scale or within a year at the PEZ scale. Heavy continuous cover, limited weather suitable for flying, and often dispersed elk herds severely restrict this methodology. Consequently, monitoring of elk numbers has been adjusted to focus on two bellwether areas, smaller portions of GMUs where elk population objectives can be monitored more consistently. The St. Joe Bellwether Area (SJBA), approximately 258 square miles in size, consists of portions of GMU 4, 6 and 7 (Figure 1).

Figure 1. GMUs 6, 7, and 9 with the St. Joe Bellwether Area shaded in blue.



Monitoring results suggested elk herd growth between 1998 and 2002 and no substantive change between 2002 and 2009 (Table 2). From 2009 through 2012, the elk herd in the SJBA declined 61%. Attaining the 10-year goal of a 40% gain would result in a population of 1,768 elk. Return to the average 1998-2009 average of 3,156 elk (a 150% gain) or the 2002 high of 3,826 elk (a 203% gain) would take considerably more than the 10-year timeframe of the 2014 Elk Plan.

Table 2. Aerial elk survey estimates from bellwether area ($\pm 90\%$ Bounds).

Year	POPULATION SIZE
1998	2087 \pm 468
2000	2860 \pm 442
2002	3826 \pm 812
2006	3751 \pm 535
2009	3256 \pm 700
2012	1263 \pm 266

Survival Rates of Cow Elk

IDFG placed radio collars on 26 adult female elk in GMUs 6 and 7 and monitored them from 1995 – 1998 to determine annual adult elk survival rates. Another collaring effort took place from 2011 – 2013 when 39 adult female elk were radio-collared.

Survival rates were similar between the two periods (Table 3) although small sample sizes and the lack of reported confidence intervals (CIs) for the early time period make comparisons difficult. Further, survival rates during the 1990s occurred in the presence of an either-sex elk season; the season was changed to an antlered-only season after 2012.

Table 3. Adult female elk survival rates in the St Joe River drainage, GMUs 6 and 7, 1995 – 1998 and 2011 – 2013. (n=26 for 1995-98; n=39 for 2011-2014).

Time Period	Survival Rate	95% C.I.
Jun 1995 – May 1996	0.92	Not reported
Jun 1996 – May 1997 ^a	0.78	Not reported
Jun 1997 – May 1998	1.00	Not reported
Jun 2011 – May 2012	0.88	0.73-1.00
Jun 2013 – May 2013	1.00	---
Jun 2013 – Feb 2014	0.92	0.81-1.00

^a Severe winter

Pregnancy Rates

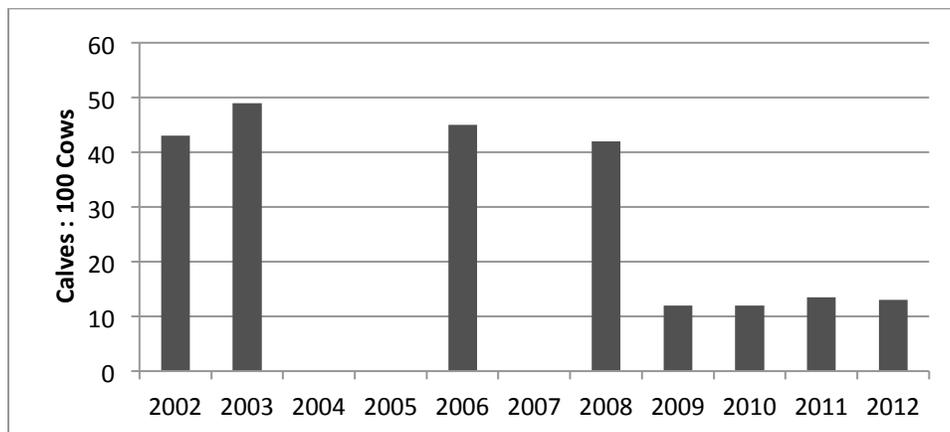
Cow elk that were captured for the radio-collaring effort in 2013 were tested for pregnancy. Seventeen of eighteen elk were pregnant for a 94% pregnancy rate. While these data are too sparse to be conclusive, they are consistent with normal to high pregnancy rates and higher than pregnancy rates found in north-central Idaho (Pauley and Zager, 2010).

Recruitment

As stated earlier, population size in the PEZ is difficult to obtain due to weather constraints and heavy cover. As such, recruitment, which is more achievable, is used as an indicator of population health. Recruitment estimates are reported as the number of calves observed per hundred cows (calf:cow ratios). Composition flights are typically conducted in winter (Jan-Feb) but some summer composition flights have also been conducted to examine timing of changes in recruitment estimates within the year.

For the SJBA, winter calf:cow ratios were relatively consistent from 2002 – 2008, but in 2009 there was an abrupt decline in the winter calf:cow ratio following severe deep-snow winters of 2008/09 and 2009/10. Since then, calf:cow ratios have remained low (Figure 2) despite relatively mild winters and lack of major vegetative changes (e.g. large-scale fires).

Figure 2. Winter recruitment rates (calves:100 cows) from sightability surveys in the SJBA, 2002-2012.



Winter recruitment surveys were also conducted in the STBA during 2013 and 2014 (22 calves per 100 cows each year), but these surveys were conducted only to assess recruitment without the stratified random sampling design and correction for observability used in sightability surveys. Additionally, summer composition flights were conducted within the SJBA during 2013 to further assess recruitment and timing of calf mortality. The 29 calves per 100 cows observed during August 2013 was lower than those observed during prior flights in 1980, 1998, and 1999, which yielded 44, 42, and 39 calves:100 cows, respectively.

Cause-specific Mortality of Elk

IDFG has collected data through the use of radio-collars regarding the causes of elk mortality between 2006 and 2012 from the Sawtooth, Lolo, and Selway Zones, which are located immediately south and north of the MFZ. Legal harvest was documented as the primary cause of mortality for adult male elk, while wolf predation and malnutrition were documented as the leading causes of mortality for both females and calves \geq six months (Pauley and Zager 2011).

Neonate elk (< 6 months) are killed primarily by predation from bears and lions (Schlegel 1986, Zager and White 2003), although predation by wolves, malnutrition, and other causes can be important factors (Zager et al. 2007).

Elk population summary

The elk objective for GMUs 6, 7, and 9 under the 2014 Elk Management Plan (IDFG 2014) calls for an increase of up to 40% in elk from existing numbers by 2023. Instead, this segment of the Panhandle elk herd appears likely to continue decreasing (the most recent observed annual rate of decrease is 11%) without additional action. Based on stable annual survival rates of radio-collared adult cow elk averaging 93% over the past 3 years and high pregnancy rates, calf survival appears to have the most significant influence on elk population trends.

HABITAT POTENTIAL

Declining elk habitat conditions caused by a shift from early forest seral stages to less productive mid- to late-seral stages have been a source of concern for decades. Summer range habitat should include a mosaic of successional stages. Early seral habitat is more likely to provide preferred grass and forbs species. High quality summer habitat can improve elk body condition as well as cow and calf survival over the winter. Winter range habitat is primarily south-facing early-seral shrubfields that provide forage and solar exposure.

Significant fires throughout the Panhandle zone in the 1910-1940s created young productive forests that benefitted elk. Fire suppression since the 1940s and reduced timber harvest on federal lands in recent decades has resulted in an aging forest that is less productive for ungulates. Currently across the Idaho Panhandle National Forest, less than 10% of the forest is in the youngest age class. Based on historic vegetation trends, the desired condition is to have 15-28% of the forest in an early seral stage (USDA Forest Service 2011). This lack of both summer forage and winter range available to elk in some areas of the forest may be contributing to lower calf survival. However, the lack of recovery in calf recruitment after the abrupt calf recruitment drops following the 2007/2008 and 2008/2009 winters suggests habitat is not the most limiting proximate factor. The 2014 Elk Management Plan identifies the PEZ habitat limitations as moderate.

EFFECTS OF WEATHER

Winter weather can have a significant impact on elk populations in the Panhandle. A major winter event in 1996-97 caused a significant die-off that resulted in a population decline in portions of GMUs 7 and 9. Back-to-back severe winters during 2008-09 and 2009-10 further contributed to low elk survival in these areas, particularly through calf survival as evidenced by low mid-winter calf ratios (Figure 2). Weather can exacerbate the influence of predation

(Hebblewhite et al. 2005) by making elk more vulnerable to predation during the winter, concentrating them on key winter ranges and weakening individuals. Moderate winters from 2011 to 2014 were not associated with a recovery in elk recruitment, however, suggesting other factors were dominating calf survival. By comparison, moderate winters following 1996-97 resulted in high calf recruitment and a subsequent rebound in adult elk numbers.

Habitat conditions and weather work in concert to affect elk populations. For example, calf birth weight, which is influenced by maternal health, has been identified as an important factor in calf survival in many studies (Singer et al., 1997, White et al. 2010 and more). Maternal health is influenced by both weather and habitat quality.

EFFORTS TO ADDRESS PANHANDLE ZONE ELK DECLINE

This predation plan will provide steps to address the 2014 Elk Management Plan (IDFG 2014) objectives of increasing elk up to 40% in GMUs 6, 7, and 9.

Changes in Elk Hunting Seasons and Harvest Strategies

In response to declining elk numbers and low calf recruitment, IDFG reduced the length of the either-sex portion of the general elk season in GMUs 7 and 9 from 7 days in 2007 to 3 days in 2008 and eliminated all antlerless harvest in GMUs 6, 7, and 9 in 2011. Antlered harvest, hunter numbers, and the percent spikes in the harvest have all declined during that time (Table 4).

Table 4. Elk harvest, hunter numbers, and % spikes in the harvest, GMUs 6, 7, 9; 2003 – 2012.

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Antlerless Harvest	76	64	79	63	93	36	34	29	0	0
Antlered Harvest	209	201	263	278	251	178	120	112	62	75
Hunter Numbers	2316	2190	2163	2273	2160	2189	1343	1432	1081	782
% Spikes	15.9	36.6	31.3	12.9	10.5	13.8	5.7	25.7	10.8	3.5

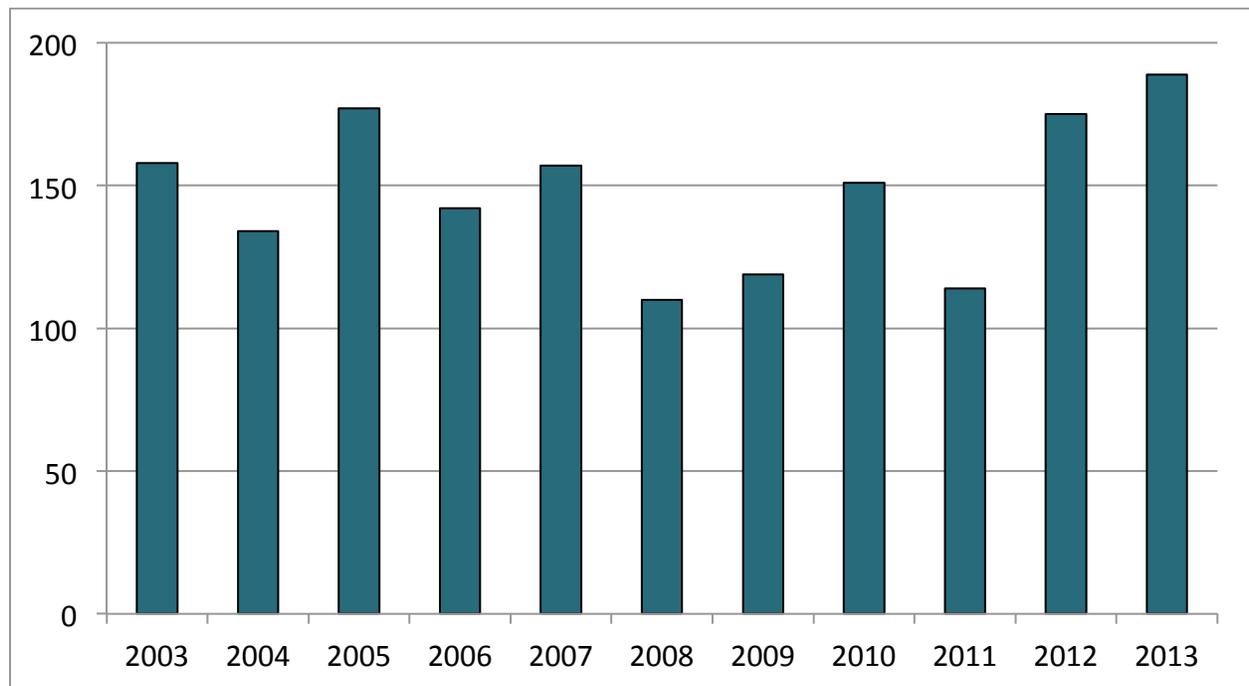
Changes in Black Bear Hunting Seasons and Harvest

Fall black bear seasons in GMUs 6, 7, and 9 have been consistent for over 10 years. The season is open Aug 30 - Oct 31. Spring seasons were consistent until 2012. Prior to 2012, the spring season in GMU 6 ran from Apr 15 – May 31 and in GMUs 7 and 9 from Apr 15 – Jun 30. In 2012 an effort was made to increase harvest in these GMUs. The spring season in 6, 7, and 9

was extended to Jun 30 and a second bear tag could be used. In 2013, the spring season in GMUs 7 and 9 was further extended to Jul 31. A second bear tag and electronic calls could be used in GMUs 6, 7, and 9.

Harvest in GMUs 6, 7, and 9 (Figure 3) is impacted by spring access and the fall berry crop. These GMUs are targeted for “moderate” harvest levels in the Black Bear Management Plan (IDFG 1998). Harvest criteria generally fall into the light to moderate categories but small sample sizes result in significant fluctuation. There is room for additional harvest in these GMUs, yet providing a bear population within the management guidelines. Harvest density in GMU 6 during the 2013 season was the highest of any GMU in the state.

Figure 3. Black bear harvest in GMUs 6, 7, and 9; 2003-2012.



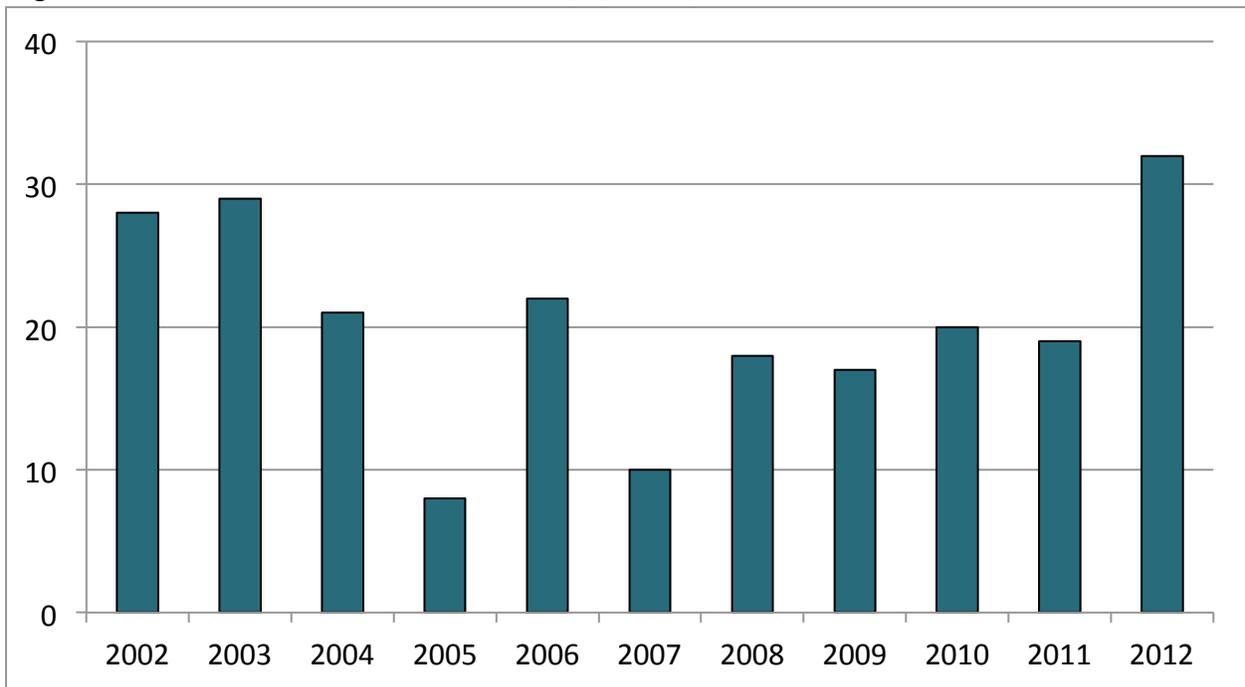
Changes in Mountain Lion Hunting Seasons and Harvest

Mountain lions seasons in GMUs 6, 7, and 9 were fairly stable until 2012/13 season. The 2011/2012 season ran from Sep 15 – Feb 16. In 2012/2013 the season was extended to Mar 31. In 2013/2014 the season was extended in GMUs 7 and 9 to June 30 and the use of a second tag and electronic calls was allowed.

Harvest levels vary significantly in these GMUs (Figure 4) depending on snow and access conditions as well as conditions in other GMUs within the Panhandle. Within the entire PEZ harvest levels are significantly above the Mountain Lion Management Plan’s objective of maintaining a harvest of at least 61 animals (IDFG 2002); the harvest in the 2013/2013 season

was 130, allowing for significantly more harvest while still being within the harvest guidelines.

Figure 4. Mountain lion harvest in GMUs 6, 7, and 9; 2003 – 2012.



Changes in Wolf Hunting Seasons and Harvest

Idaho's first wolf season occurred in 2009/2010. Hunting and trapping seasons are summarized in Table 5. There was no hunting or trapping seasons in 2010/11 because of the federal re-listing of wolves on the Endangered Species List.

Wolf harvest in GMUs 6, 7, and 9 has ranged from 18 wolves during the initial harvest year of 2009, when only hunting was allowed, to 31 wolves during 2011/2012, with the addition of trapping, larger bag limits, and longer seasons (Table 6). During years when trapping was allowed, trapping was the primary harvest method.

Table 5. Wolf trapping and hunting seasons in the Panhandle Zone, 2009-2014.

Year	Quota	Hunting Season	# of Hunting Tags	Trapping Season	# of Trapping Tags
2009/10	30	Oct 1 – Mar 31	1	None	--
2010/11	No Season				
2011/12	None	Aug 30 – Mar 31	2	Nov 15 – Mar 31	3
2012/13	None	Aug 30 – Mar 31	5	Nov 15 – Mar 31	5
		July 1 – Mar 31 (private lands only)			
2013/14	None	Aug 30 – Mar 31	5	Nov 15 – Mar 31	5
		July 1 – Mar 31 (private lands only)			

Table 6. Human-caused wolf mortality in GMUs 6, 7, and 9 since 2009-2010.

Year	Hunting	Trapping	Other Human-caused Mortality ^b	Total
2009/10	14	--	4	18
2010/11	--	--	1	1
2011/12	13	18	0	31
2012/13	4	21	3	28
2013/14 ^a	10	6	0	16

^a Through Feb 16, 2014

^b Includes illegal kills, control actions, road kill, etc.

PREDATION MANAGEMENT PROGRAM

PROPOSED ACTIONS

This Predation Management Plan considers the entire PEZ. While predation management is not precluded elsewhere in the PEZ, predation management under this plan will focus efforts in those portions of GMUs 6, 7, and 9 with demonstrated severe elk declines.

Black Bears

Regulated harvest by licensed hunters is IDFG's preferred tool for reducing black bears in areas within the PEZ. IDFG has lengthened seasons in GMUs 6, 7, and 9, allows the use of hounds, bait, electronic calls, and the use of second tag in all of these GMUs.

Harvest densities are relatively high in this area; black bear harvest density from 2012-2014 in GMU 6 ranks 2nd and GMU 7 ranks 6th out of the 99 GMUs in the state. Harvest has shown an increasing trend over the past 5 years (Figure 3) while still falling within the management criteria in the black bear management plan. The objective under this predation management plan is to maintain bear harvest at 180 or above (25% above the previous 10-year average) for 2014 – 2019.

There are a limited number of options to increase harvest by licensed hunters. The only month that is not open to harvest during the time when bears are out of the den in August. IDFG could allow harvest during this time period. Control actions coordinated with Wildlife Services could be undertaken on black bears if it was determined that this would benefit elk survival during specific times of the year.

Mountain Lions

Regulated harvest by licensed hunters is IDFG's preferred tool for reducing mountain lions in areas within the PEZ. IDFG has lengthened seasons in GMUs 6, 7, and 9 and allows the use of hounds. A second tag and the use of electronic calls are allowed in all of these GMUs.

Harvest densities are relatively high in this area; mountain lion harvest density from 2012-2014 in GMU 7 ranks 7th and GMU 6 ranks 11th out of the 99 GMUs in the state. Mountain lion harvest increased significantly in these GMUs in 2012, but harvest can be greatly affected by snow conditions. The mountain lion harvest is still well above the criterion established in IDFG's mountain lion management plan (IDFG 2002). The objective under this predation management plan is to maintain lion harvest at 24 or above (25% above the previous 10-year average) for 2014 – 2019.

IDFG has limited options to increase mountain lion harvest by licensed hunters. Seasons could be extended, however past history has shown little effect of longer seasons outside of the period when dogs can effectively be used. IDFG could coordinate control actions with Wildlife Services if it was determined that reducing mountain lion densities in some GMUs would benefit ungulate survival rates.

Wolves

Regulated harvest by licensed hunters and trappers is IDFG's preferred tool for reducing wolves

in the PEZ. Because hunting and trapping is a new activity, there is not a group of hunters or trappers with a significant history of wolf harvest. Both of these activities have a “learning curve” that will allow hunters and trappers to become more effective through time. Regulations have been changing since wolves were allowed to be taken through sport hunting in 2009 so investigation of harvest trends is not appropriate. IDFG currently offers liberal opportunities and limits for wolf hunting and trapping (Table 5).

Harvest densities in GMUs 6 and 7 are relatively high; wolf harvest density from 2012-2014 in GMU 6 ranks 11th and GMU 7 ranks 13th of 99 GMUs in the state. Harvest density varies from year to year, depending on weather, access, and wolf density. Current wolf harvest in GMUs 6, 7, and 9 (as of 04/01/2014) is 16 wolves, 43% below the prior 2-year average.

Existing liberal wolf harvest seasons will likely be kept in place through 2019. Management of wolves in these GMUs will be adaptive and will rely on monitoring to determine the appropriate management actions. IDFG will monitor legal harvest levels and adjust seasons and control actions accordingly while staying consistent with the Idaho Wolf Conservation and Management Plan (Idaho Legislative Wolf Oversight Committee 2002).

IDFG recently extended the trapping season in GMUs 7 and 9 and a portion of GMU 6. The trapping season will start on October 10 in the 2014 season in an attempt to increase harvest. The results of this change are unknown at this time. IDFG could lengthen the hunting season on public lands; the current season ends March 31 on public lands and runs year-round on private lands. The use of bait for hunting wolves is currently not allowed. Allowing wolf hunters to hunt over bait for wolves during the open season, especially in the winter months, may increase their effectiveness and increase wolf harvest. If deemed necessary, IDFG could hire hunters and trappers after the regulated harvest season closes to remove additional wolves from specific areas if deemed necessary. IDFG could contract with Wildlife Services to remove additional wolves through means such as hunting, trapping, and aerial gunning if it felt these actions were warranted.

OBJECTIVES AND MEASURES OF SUCCESS

The goal of the Predation Management Plan is to restore elk numbers and elk hunting opportunities. The specific objective is to provide an elk herd exhibiting an average 1% to 5% annual rate of growth in GMUs 6, 7, and 9 for 10 years, consistent with objectives of the Idaho 2014 Elk Management Plan (IDFG 2014). To achieve this objective IDFG will seek to affect elk population parameters through a variety of means, including improving elk habitat and reducing predator populations without affecting their viability.

Success will be measured by tracking a variety of parameters, including elk calf:cow ratios, the percent of yearling elk in the harvested population, and elk population trend.

MONITORING

Monitoring is a key component of any predation management plan and integral to adapting and refining management. Both predators and prey must be monitored to provide an adaptive framework for decisions.

Elk

Harvest characteristics will continue to be monitored annually through a mandatory hunter report card system. Recruitment will be monitored annually through winter aerial survey flights to estimate calf:cow ratios. Summer composition flights may be flown if deemed necessary to help determine timing of calf:cow ratios.

Black Bear, Mountain Lion, and Wolves

IDFG will monitor black bear, mountain lion, and wolf harvest through required harvest checks and Big Game Mortality Report (BGMR) forms. Harvest checks involve the extraction of a tooth for aging and collection of a meat sample for DNA analysis of wolves. BGMRs are required for all hunter-harvested animals and other mortality causes, such as road-killed animals. BGMRs provide detailed information on age, sex, location, and date and method of harvest. Harvest levels, age composition, and the sex ratio of the harvest are management criteria for black bears and mountain lions.

IDFG will manage black bears and mountain lions to maintain criteria identified in each species statewide management plan. IDFG will continue statewide monitoring of the wolf population to ensure compliance with post-delisting population criteria, including an estimate of the minimum number of wolves and breeding pairs on an annual basis. In addition to this required monitoring, IDFG will be radio-collaring pups and adults, conducting genetic surveys of historic and predicted rendezvous sites (Ausband et al. 2010), using remote cameras, and estimating exploitation rates using DNA collected from rendezvous sites and hunter-harvested wolves.

BUDGET

The funds required to implement actions in this plan are available as part of larger, ongoing IDFG programs. Aerial surveys are funded through statewide ungulate monitoring budgets. Funds for these efforts come from a combination of Pittman-Robertson funds, federal wolf appropriations, and IDFG license dollars. If lethal removal is required only license funds will be used.

RISK ASSESSMENT

PREDATOR POPULATIONS

IDFG's actions under this plan will be limited to black bears, mountain lions, and wolves.

Black bear management objectives in these GMUs are targeted for "moderate" harvest levels (IDFG 1998). Harvest criteria generally fall into the light to moderate categories but small sample sizes result in significant fluctuation. There is room for additional harvest in these GMUs and still be within the management guidelines.

The mountain lion management plan identifies the objective of a cougar population large enough to sustain a harvest of 61 cougars per year (the 1990-1992 average). During the past 10 years, the (entire) PEZ has sustained a harvest of 109 mountain lions per year; the most recent 3-year average harvest was 122. Reducing restrictions on mountain lion hunting would still provide a large enough mountain lion population to meet management objectives (IDFG 2002).

Holyan et al. (2013) reported ≥ 117 wolf packs and ≥ 35 documented breeding pairs in Idaho. Of the 117 packs, 9 used portions of GMUs 6, 7, and 9 in 2012. One of these packs was identified as a breeding pair. More than 500 wolves reside outside of the area encompassed in the predator management plan. Criteria identified under the Idaho Wolf Conservation and Management Plan will not be compromised.

PREY POPULATIONS

Elk will be the primary species benefitting from the proposed actions in this plan. Mule deer, white-tailed deer, and moose may benefit as well.

WILDLIFE-ASSOCIATED RECREATION OPPORTUNITY

Actions created through this plan would initially provide more opportunity for bear, mountain lion, and wolf hunting and trapping (wolves only). However, ultimately the goal of the plan would result in a decline of those species and correspond to an eventual decline in hunting and trapping opportunities.

The primary objective of this plan is to increase elk populations, thereby providing additional hunting and wildlife viewing opportunities for this species, including the possible re-establishment of the either-sex general elk hunt that has been a strong tradition in northern Idaho.

LITERATURE CITED

- Ausband, D. E., L. N. Rich, E. M. Glenn, M. S. Mitchell, P. Zager, C. M. Mack, D. A. W. Miller, and B. B. Ackerman. In review. Monitoring wolf populations using multiple survey methods. *Journal of Wildlife Management*.
- Ausband, D. E., S. Mitchell, K. Doherty, P. Zager, C. M. Mack, and J. Holyan. 2010. Surveying predicted rendezvous sites to monitor gray wolf populations. *Journal of Wildlife Management* 74:1043-1049.
- Hebblewhite, M. C.A. White, C.G. Nietvelt, J.A. McKenzie, T.E. Hurd, J.M. Fryxell, S.A. Bayley, and P.C. Paquet. 2005. Human activity mediates a trophic cascade caused by wolves. *Ecology*. 86:2135-2144.
- Holyan, J., J. Husseman, J. Struthers, and B. Thomas. 2013. 2012 Idaho wolf monitoring progress report, Idaho Department of Fish and Game, Nez Perce Tribe Wolf Recovery Project, Lapwai, Idaho.
- Idaho Department of Fish and Game. 1998. Black bear management plan 1999–2010: status and objectives of Idaho’s black bear resource. Idaho Department of Fish and Game, Boise, ID.
- Idaho Department of Fish and Game. 2000. Policy for avian and mammalian predation management. Idaho Department of Fish and Game, Boise, ID.
- Idaho Department of Fish and Game (IDFG). 2002. Mountain lion management plan 2002–2010. Idaho Department of Fish and Game, Boise, ID.
- Idaho Department of Fish and Game. 2014. Idaho Elk Management Plan. Idaho Department of Fish and Game. Boise, ID.
- Idaho Legislative Wolf Oversight Committee. 2002. Idaho wolf conservation and management plan. Idaho Legislative Wolf Oversight Committee, as modified by 56th Idaho Legislature, second regular session.
- Pauley, G. and P. Zager. 2010. Effects of wolf predation on elk populations in Project W-160-R-37. Wildlife Research Project Report, Idaho Dept of Fish and Game, Boise, ID.
- Singer, F. J., A. Harting, K. K. Symonds, and M. B. Coughenour. 1997. Density dependence, compensation, and environmental effects on elk calf mortality in Yellowstone National Park. *Journal of Wildlife Management*. 61:12–25.
- USDA Forest Service. 2011. Draft Land Management Plan. Idaho Panhandle National Forests. Coeur d’Alene, ID, 438 pp.
- White, C. G., P. Zager, and M. Gratson. 2010. Influence of predator harvest, biological factors, and landscape elk calf survival in Idaho. *Journal of Wildlife Management*. 74:355-369.

**Idaho Department of Fish and Game Predation Management Plan
for the Sawtooth Elk Management Zone**

**31 August 2012
Updated 7 February 2014**



**Idaho Department of Fish and Game
Southwest Region
3101 S. Powerline Road
Nampa, ID 83686**

Idaho Department of Fish and Game Predation Management Plan for the Sawtooth Elk Management Zone

Table of Contents

INTRODUCTION	1
DEFINITION OF PROBLEM.....	3
ELK POPULATION OBJECTIVES AND CURRENT STATUS.....	3
Background – Sawtooth Elk	4
History of Elk Population Status.....	5
Annual Survival of Elk	6
Cause Specific Mortality of Elk.....	8
Density Dependence, Weather, and Habitat	9
EFFORTS TO ADDRESS ELK DECLINE	9
Changes in Elk Hunting Seasons and Harvest Strategies	9
Changes in Elk Habitat	10
Changes in Black Bear and Mountain Lion Hunting Seasons	12
Wolf Hunting Seasons and Population Estimates.....	12
RISK ASSESSMENT	14
Predator Population.....	14
Prey Populations	15
Hunting and Wildlife Associated Recreation Opportunity	15
PROGRAM	15
Boundaries	15
Current Status.....	15
Proposed Actions	15
Regulated Sport Harvest	16
Other Actions	17
Objective and Measures of Success.....	17
MONITORING.....	17
Elk.....	17
Wolves	17

Budget.....	18
LITERATURE CITED	19
APPENDIX A.....	23
APPENDIX B.....	28

SAWTOOTH ELK PREDATION MANAGEMENT PLAN

SOUTHWEST REGION

INTRODUCTION

The IDFG Policy for Avian and Mammalian Predation Management (2000) identifies how predation might be managed when prey populations are not meeting management objectives (Appendix A). Managers recognize the role of predators in an ecological and conservation context. Impacts of the removal of individual predators on the structure of predator and prey populations will be considered. The actions by the Department must be based on the best available scientific information, and will be evaluated in terms of risk management to all affected wildlife species and habitats.

Predator populations will be managed to assure their future recreational, ecological, intrinsic, scientific, and educational values, and to limit conflicts with human enterprise and values. Where there is evidence that predation is a significant factor inhibiting the ability of a prey species to attain Department population management objectives and the Department decides to implement predation management actions, the management actions will ordinarily be directed by a predation management plan (IDFG 2000).

The first Predation Plan was developed for the Lolo Elk Zone in 1999 and finalized in 2011 (IDFG 2011). In 1999, cougars and black bears were the primary cause of mortality for elk calves, and plans were implemented to control the predation impacts of those carnivores. Since that time, wolves became well established in the Lolo Zone and became the primary proximate cause of mortality of elk, though bears and cougars were still impacting neonates (Pauley and Zager 2011). Moreover, cougars continue to prey on adults, but becoming more difficult to verify because scavenging by wolves complicates mortality site investigations.

Gray wolves (*Canis lupus*) were listed in Idaho as an experimental nonessential population under Section 10(j) of the Endangered Species Act (ESA) when they were reintroduced into Idaho and Yellowstone National Park in 1995 and 1996. By 2002, wolves had reached recovery levels of 30 breeding pairs well distributed among Idaho, Montana, and Wyoming for 3 consecutive years. However, delisting did not occur until 2009, the first year Idaho Department of Fish and Game (IDFG) set harvest seasons for wolves. In 2010, responsibility for wolf management went back to the U.S. Fish and Wildlife Service because efforts to renew a 2006 agreement giving day-to-day management to Idaho Fish and Game had failed. Wolves were de-listed again in 2011 after Congress passed the federal budget which included a rider to republish the 2009 delisting rule returning day- to- day management of wolves back to IDFG.

Prior to delisting, Idaho and Montana developed management plans and enacted laws that provided adequate regulatory mechanisms that would assure long-term survival of wolves.

Idaho’s plan discussed the possibility of reducing the impacts of predation by removing wolves affecting big game populations (IDFG 2002). During the past 5-10 years IDFG reviewed statewide elk data to determine if elk populations were below management objectives. Included among the zones below elk management objectives was the Sawtooth Zone that includes Game Management Units (GMUs) 33, 34, 35 and 36 (Figure 1).

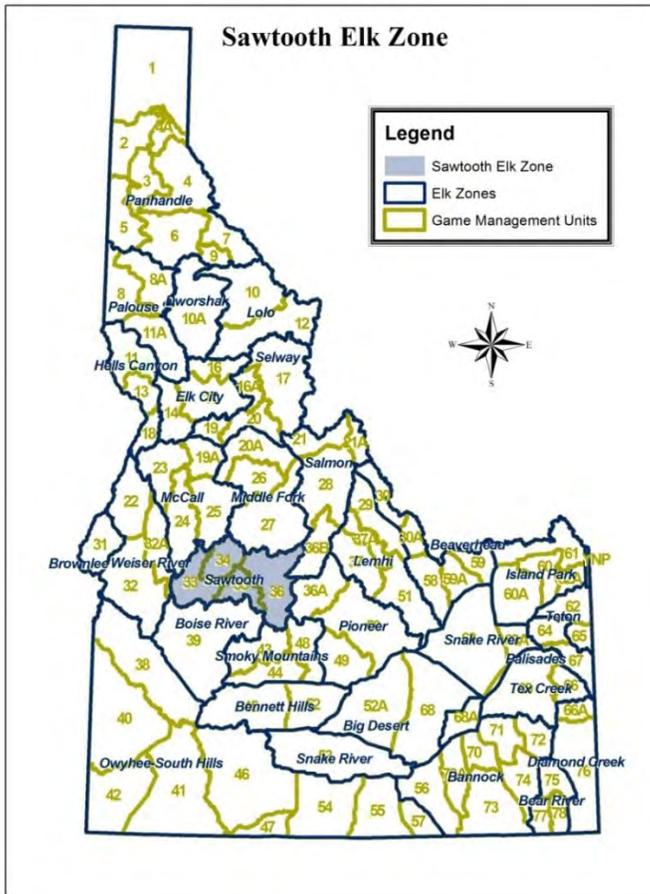


Figure 1. Sawtooth Elk Management Zone.

This plan reviews evidence that wolf predation may be a major mortality cause preventing the Sawtooth Zone elk population from reaching IDFG population management objectives. It also identifies ongoing efforts to reduce adverse impacts of other factors influencing the Sawtooth Zone elk population, including habitat alteration and harvest, and identifies techniques to monitor the effects of lethal wolf removal. This plan provides the analysis that sets the stage for increased regulated harvest of wolves and agency wolf removal.

DEFINITION OF PROBLEM

Elk populations in the Sawtooth Elk Management Zone (Sawtooth Zone) are below historic levels and current population management objectives. Data analysis on radio-collared elk demonstrates that wolf predation and malnutrition of cow elk and elk between 6 months and 1-year are the primary causes of mortality and are preventing the cow elk component of the population from reaching management objectives (Pauley and Zager 2011). Based on survival data and computer modeling, the cow segment of the Sawtooth Zone elk population was expected to continue to decline at a rate of 3 to 5% annually since 2009. The 2013 population estimate obtained from an aerial survey showed an 11% decline or an average decline of ~3% annually (Table 1). The bull segment of the Sawtooth Zone elk population had the potential to double with an increase of 26% annually. The bull segment realized an increase at a rate of 7% annually.

ELK POPULATION OBJECTIVES AND CURRENT STATUS

Management objectives for elk in the Sawtooth Zone (GMUs 33, 34, 35, 36) since 1999 are 3,050 – 4,550 cow elk and 600 - 975 bull elk (Kuck 1999). The 2014 draft elk plan adjusted the Sawtooth Zone objectives very little. Proposed objectives for the Zone are to maintain an elk population consisting of 3,000 – 4,500 cow elk, 630-945 bull elk, and 360-540 adult bull elk (In Prep 2014). The 2009 survey indicated that all components of the elk population were below population objectives in the Sawtooth Zone. Cow and bull elk remained below objectives during the 2013 surveys (Figures 2 and 3).

Table 1. Current population objectives and status of Sawtooth Zone elk, 2009 and 2013 survey.

Cows		Bulls		Adult Bulls		Bull:Cow Ratios		Adult Bull:Cow Ratios	
<i>Objectives</i>	<i>Status</i>	<i>Objectives</i>	<i>Status</i>	<i>Objectives</i>	<i>Status</i>	<i>Objectives</i>	<i>Status</i>	<i>Objectives</i>	<i>Status</i>
3,050-4,550 ¹	2,696	600-975	251	355-575	182	18-24	9	10-14	7
3,000-4500 ²	2,396	630-945	324	360-540	202	18-24	14	10-14	8

¹ 2009, ² 2013

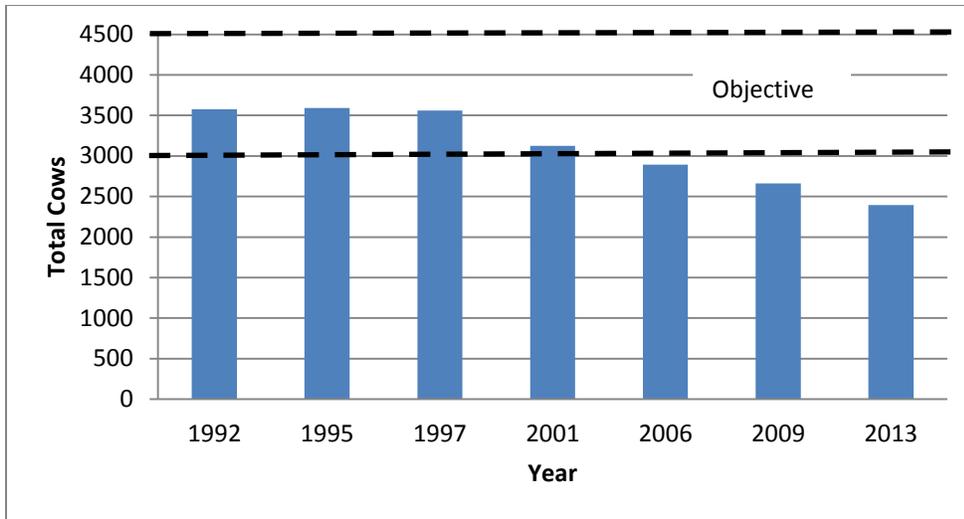


Figure 2. Total number of cow elk in the Sawtooth Zone, 1992-2013. Cows remained within objective until 2006.

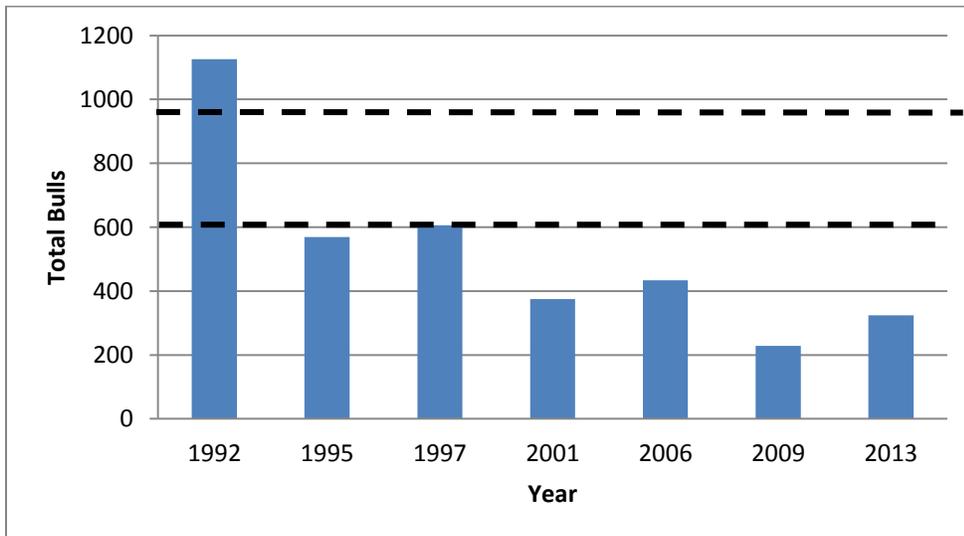


Figure 3. Total number of bull elk in the Sawtooth Zone, 1999-2013 and bull objective..

Background – Sawtooth Elk

Elk harvest in the Sawtooth Zone occurs in each GMU, however, elk typically migrate from higher elevations in GMUs 34, 35 and 36 to lower elevation winter ranges in GMUs 33 and 35. Harvest objectives and population estimates target these concentrated wintering elk herds. Winter ranges in GMUs 33 and 35 are not geographically isolated from each other, with elk moving between the two GMUs among years. No elk are known to winter in GMU 34 and a

small number of elk were sustained by winter feeding during the 1990's in GMU 36, near Stanley, where natural winter range is very limited. Population objectives for the last 15 years were established in the elk management plan finalized and adopted by the Idaho Fish and Game Commission in 1999 (Kuck 1999). Objectives during this time period reflected a balance between habitat potential, harvest opportunity, and concerns/experience with ungulate damage to private property. Habitat potential is evaluated by considering historic numbers of elk in an area, current population levels, and associated vegetative conditions. IDFG primarily uses aerial surveys to estimate elk populations, informal reviews of vegetative conditions to assess carrying capacity (due to the difficulty of large-scale forage assessment, informal reviews are often the only habitat data available to biologists), and mandatory harvest reports to glean harvest information.

Aerial surveys were conducted in parts of the Sawtooth Zone as early as the 1950s; however the low quality of information (primarily the lack of sightability modeling) prevents relating the results to population trend. Sightability-corrected aerial surveys began in the early 1990s. At that time, winter elk population estimates were within or above objectives set in the 1999 elk management plan (Kuck, 1999).

History of Elk Population Status

Calf:cow ratios estimated from aerial surveys remained stable (>30 calves:100 cows) in all surveyed units ($r^2 = 0.0087$) until 2009 ($r^2 = 0.121$), when recruitment ratios dipped below 20 calves:100 cows (Figure 4 and 5).

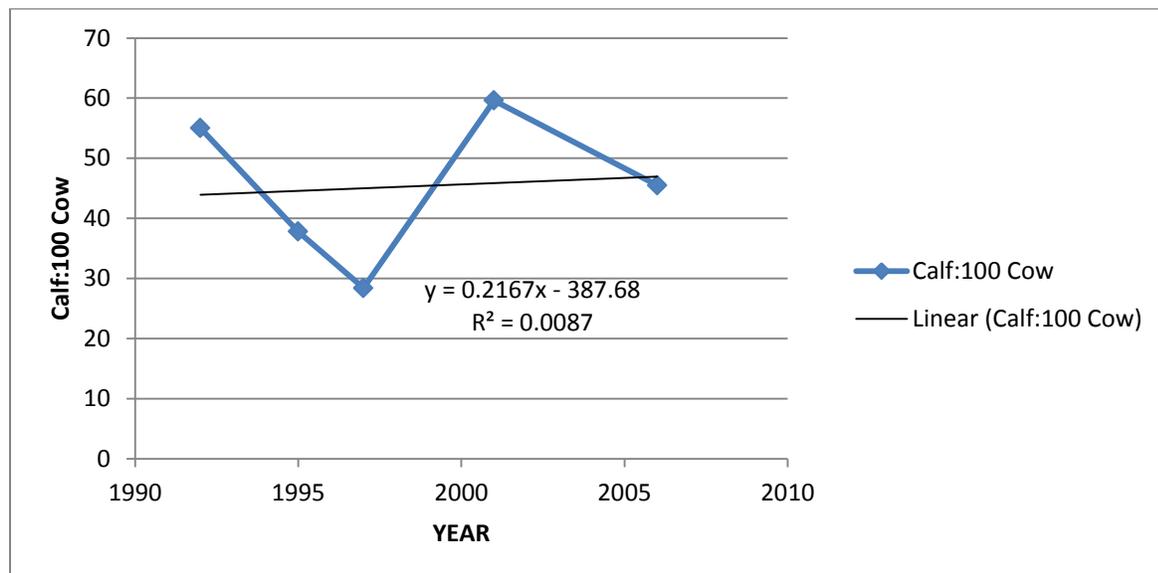


Figure 4. Calf:100 Cows in Sawtooth Elk Zone, 1990-2006.

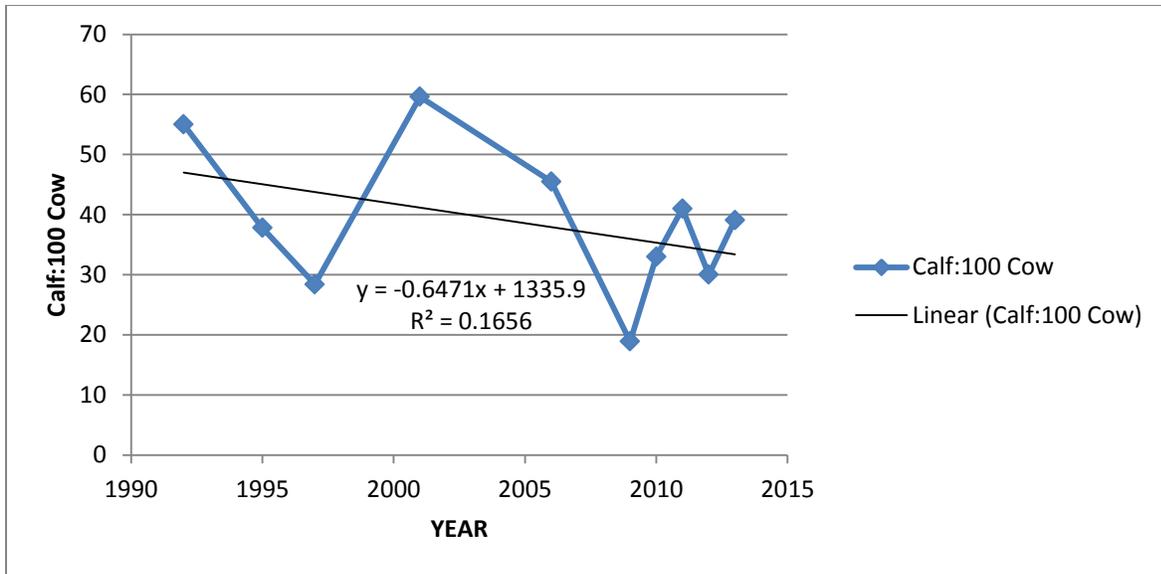


Figure 5. Calf:100 Cows in Sawtooth Elk Zone, 1990-2013. Early winter calf:cow ratios did rebound following the 2009 survey.

Annual population growth rates were calculated from winter aerial survey population estimates. No significant ($P < 0.05$) trends were observed in any of the GMUs, however mean growth rates ($R = 0.94$) indicated declining populations since 2001 (Figure 6).

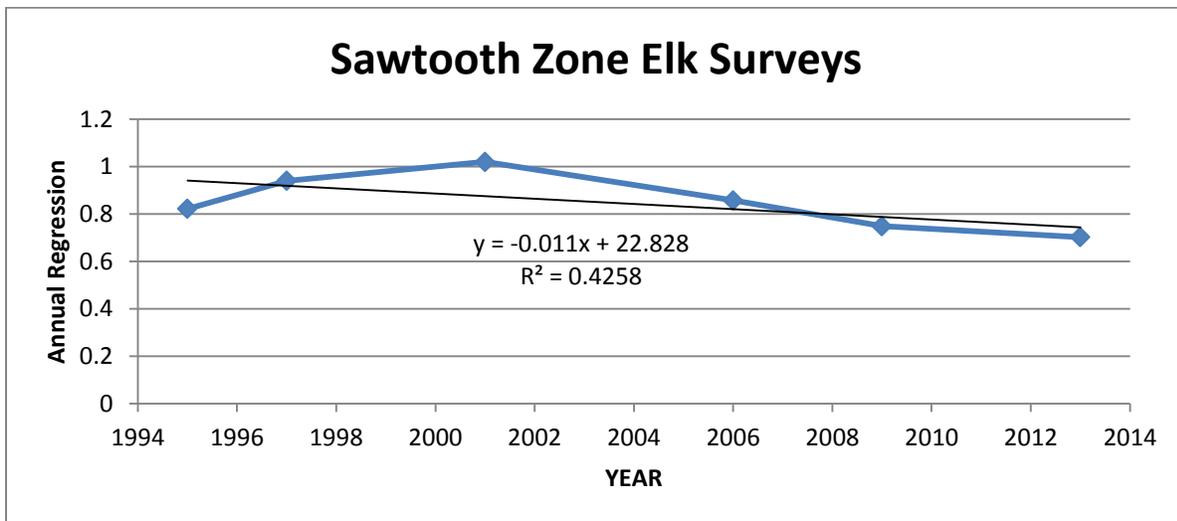


Figure 6. Annual growth rate of elk in the Sawtooth Zone 1992-2013.

Annual Survival of Elk

During January and February 2006 – 2012, IDFG research staff captured and radio-collared 233 elk (95 adult females, 51 adult males, 47 female calves, 40 male calves) to measure annual survival and reproduction. Only elk ≥ 6 months were radio-collared because earlier research

showed wolf caused mortality was very low in neonates (<6 months old). Neonates were killed primarily by bears, cougars, malnutrition, and other causes which varied among years (White et al. 2010). Calves were monitored for survival status through June 1 when calves were fully “recruited” into the adult population. The Kaplan-Meier staggered entry method (Pollock et al. 1989) was used to produce annual survival estimates of adult cow elk based on biological years beginning 1 June 2008 and ending 31 May 2012 (Table 2).

Table 2. Annual survival rates of adult elk, and 6-month (approx. Jan – 31 May) survival rates of calf elk, radio-collared on the Lowman study area in Idaho (*Table adapted from Wolf Elk PR11 S11 9-13*).

Year	Bulls		Cows		Calves	
	S ^a	(SE)	S	(SE)	S	(SE)
2008	0.42	(0.08)	0.74	(0.05)	0.35	(0.06)
2009	0.65	(0.09)	0.92	(0.04)	0.30	(0.06)
2010	0.47	(0.08)	0.87	(0.04)	0.78	(0.09)
2011	0.76	(0.11)	0.84	(0.05)	0.40	(0.11)
2012	0.85		0.90			

^a Survival rates and standard errors calculated following Pollock et al. (1989).

Based on the radio-collared elk data and modeling, cow and calf elk survival rates may be inadequate to sustain growth or stability of the cow elk population, preventing cow abundance from reaching management objectives within the Sawtooth Zone. Elk population growth rates are sensitive to adult cow survival and populations that are stable or increasing typically exhibit cow survival rates $\geq 90\%$ (Eberhardt 1985). Furthermore, low calf survival (and ultimately recruitment) likely contributes substantially to population decline as variation in population trends are often linked to juvenile vital rates (Gaillard et al. 1998, Raithel et al. 2005) (Table 3).

Table 3. Calf elk recruitment rates in the Sawtooth Elk Zone.

Year	Calf:Cow January	Cows - January	Calves - January	Cow Survival	Calf Survival	Cows June	Calves June	Calf:Cow* June
2008	26:100	1090	280	0.74	0.35	807	98	12:100
2009	19:100	1103	207	0.92	0.30	1015	62	6:100
2010	33:100	1154	394	0.87	0.78	1004	307	31:100
2011	39:100	764	300	0.84	0.40	642	120	19:100
							AVG	17:100

*June calf:cow ratios assumes cow survival rate is 100% through December.

Cause Specific Mortality of Elk

Cause specific mortality rates were estimated from radio-telemetry data. Dead radio-collared elk were investigated to establish the cause of death using techniques reported by Hamlin et al. (1984). Mortality events were attributed to one of six causes: 1) wolf predation, 2) wolf predation/malnutrition, 3) mountain lion predation, 4) human harvest, 5) malnutrition, and 6) unknown causes (includes automobile accident). Wolf predation was the leading cause of mortality for all elk combined, followed by harvest, wolf predation related to malnutrition, malnutrition, unknown/other, and cougar predation (Figure 7). Legal harvest was the leading cause of mortality for adult bull elk and wolf predation and malnutrition were the leading causes of mortality for both cows and calves.

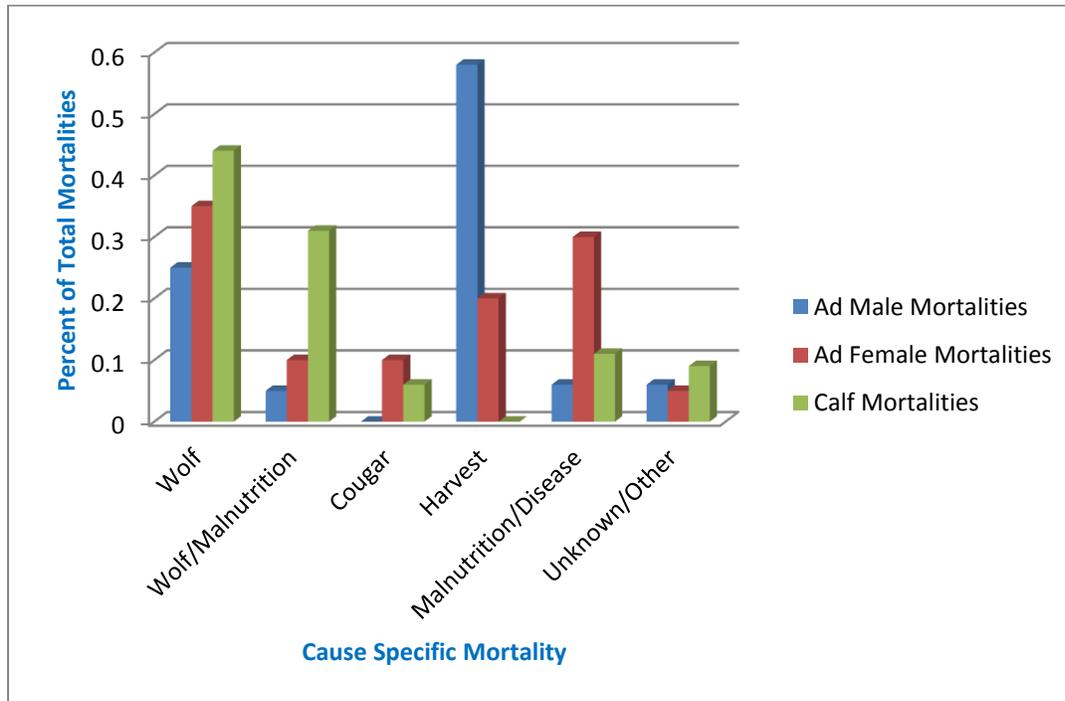


Figure 7. Cause-specific mortality (Adult male: n=36, Adult female: n=20, 6 month calf: n=36, total: n=92) of elk ≥ 6 -months old in the Sawtooth Elk Zone 2006-2012.

Evidence from other wolf-elk systems provides some insight into additive mortality. In systems without wolves, cow elk survival rates, in the absence of hunting mortality, are typically in the range of 0.90 or higher (White 1985, Freddy 1987, Leptich and Zager 1991, Unsworth et al. 1993, McCorquodale et al. 2003, White and Garrott 2005). With the addition of wolf predation, adult cow survival rates are often much lower (0.71 for cow elk ≥ 8 years and 0.86 for cow elk between 3-7 years [Kunkel and Pletscher 1999] and 0.85 in YNP [White and Garrott 2005]).

Density Dependence, Weather, and Habitat

Winter plays an important role in predator/prey relationships. Ungulates become much more vulnerable during deep snow winters due to impediments to mobility and malnutrition, which may pre-dispose them to an assortment of maladies, including predation (Smith et al. 2004). Wolves are much more effective during winter, and especially during harsh winters. In addition to increasing vulnerability to predators, harsh winters cause starvation at a higher rate. Mortality during these times may be mostly compensatory, that is ungulates killed by predators may have died from starvation anyway. On a population level, this can be significant. Predators potentially could reduce the overall mortality due to starvation if they can reduce the impacts of prey on their winter range, thus allowing more animals to survive (Murphy et al. 2011). However, predator/prey interactions on winter range and predator impacts on carrying capacity are not well understood.

It is unlikely that the Sawtooth Zone elk population is currently limited by a density-dependent response to habitat. The abundance of elk estimated during the 2013 aerial surveys (3,649 elk in combined GMUs 33 & 35) was well below the maximum abundance estimated during 1992 (6,743 elk in GMUs 33 & 35) (IDFG unpublished data). Further, growth rates over that period indicate declining populations (Figure 6). A density-dependent response to these population declines should produce increased recruitment. However, recruitment rates did not increase (Table 3), which casts doubt on the prospect that the Sawtooth Zone elk population is limited by density dependent mechanisms.

EFFORTS TO ADDRESS ELK DECLINE

Changes in Elk Hunting Seasons and Harvest Strategies

In response to declines in elk numbers and extremely low calf:cow ratios in 2009, the Department made several changes in the Sawtooth Elk Zone. During the 2008 season the Department eliminated a controlled hunt targeted at alleviating elk depredation problems in GMU 33. It also moved the muzzleloader cow hunt from the general season ‘A’ tag to an unlimited controlled hunt. In 2009, the Department reduced the unlimited controlled muzzleloader cow hunt to a 50 permit hunt, reducing the number of hunters from 900 to 50 and decreasing the number of cows harvested from 200-500 to <50. IDFG also began progressively implementing restrictions on elk hunting in 2009. Zone tag quota reductions equating to a 46% reduction from 2008 tag numbers were phased in over a 3-year period, through the allocation formula of 50% of the reduction in 2009, 25% reduction in 2010, and the remaining 25% reduction in 2011 based on the 5-year average A and B tag sales from 2004 – 2008 (Table 4).

Table 4. Sawtooth Elk Zone harvest statistics 2003-2012.

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
--	------	------	------	------	------	------	------	------	------	------

Antlerless Harvest	369	284	579	324	229	104	42	44	40	42
'A' Tag	274	202	469	269	159	15	7	14	9	17
'B' Tag	2	2	3	2	1	10	2	0	0	0
CH Tag	93	80	107	53	69	79	33	30	31	25
Antlered Harvest	526	613	596	410	358	376	292	339	254	332
'A' Tag	129	129	124	108	94	68	68	56	47	60
'B' Tag	387	476	468	295	260	304	219	268	195	268
CH Tag	10	8	4	7	4	4	5	15	12	4
Hunter Numbers	5665	6024	5975	6100	4999	4037	3010	2892	1987	2104
'A' Tag	2136	2373	2332	2792	1990	952	683	656	543	554
'B' Tag	3259	3379	3326	3096	2769	2550	2231	2118	1336	1455
CH Tag	270	272	317	212	240	535	96	118	108	95
% 6+ Points	20	20	24	25	27	28	32	23	26	33

Changes in Elk Habitat

The Sawtooth Zone comprises a total of 6,580 km² (GMU 33 = 1,735 km², GMU 34 = 1,151 km², GMU 35 = 975 km², GMU 36 = 2,719 km²). Most of the area is in federal ownership, predominately United States Forest Service (USFS). These areas historically had high levels of disturbance. Approximately 15% of the Sawtooth Zone burned in wildfires between 1970 and 1994. An additional 17% burned between 1994 and 2012. Fire suppression efforts throughout the 20th century eliminated much of the natural disturbance once part of the system.

Although the Sawtooth elk population does not appear to be limited by density-dependent responses to habitat, there are data that indicate annual vegetation activity has decreased. Satellite imagery has captured Normalized Difference Vegetation Index (NDVI) for the continental US. From this, annual statistics are generated that characterize the vegetation's performance. Preliminary assessments of the annual "output" of vegetation in terms of NDVI (compilation of all active chlorophyll activity that has occurred within a 250 m pixel in one year) indicate that GMU's 34 and 36 (elk summer range) have shown decreases in their annual vegetation activity. Further, most of the higher elevation summer range has seen decreases across the time period of 2001-2011 (Figure 8). Cook et al. (1996) discussed the importance of late summer forage quality on over-winter calf elk survival. Inadequate nutrition during late summer and fall can reduce fertility, growth, and survival of elk (Cook et al. 1996). This may explain the high prevalence of malnutrition (Figure 7) on radio-marked elk in the Sawtooth Zone. Most of the malnutrition events occurred during winter 2008; a long winter with deep snows that followed an unusually dry summer and fall.

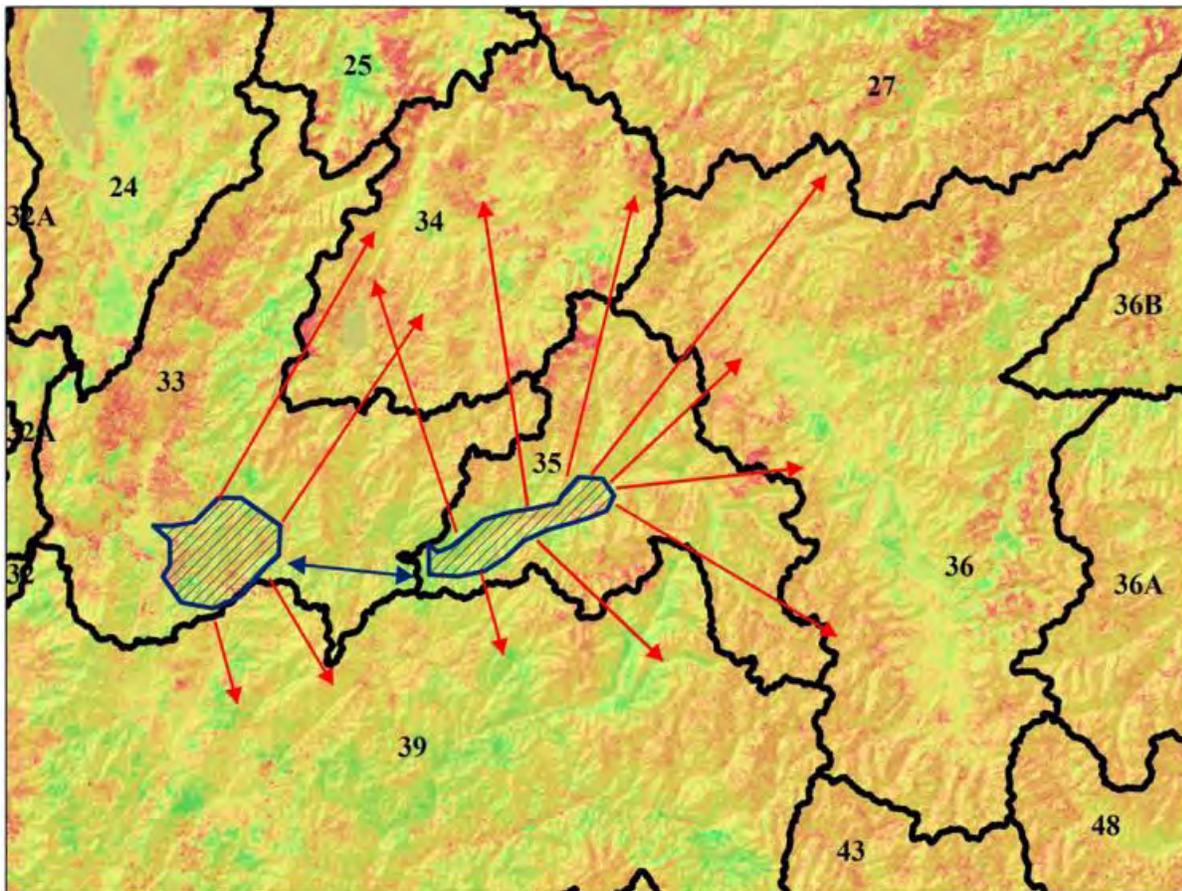


Figure 8. Total annual vegetation phenology trajectories within GMUs 33, 34, 35, and 36. Green colors represent areas that have seen a positive increase in their annual vegetation phenology, yellow-orange are areas not seeing increasing or decreasing trends, and red where decreasing trends are prevalent (2001- 2011 data). Blue hash shows elk winter range. Arrows indicate elk movement between winter and summer range based on GPS collared animals.

Most of IDFG’s habitat management efforts are focused on collaboration with the U.S. Forest Service. The focus has been to increase fire frequency through prescribed fire and more liberal “let burn” policies. IDFG has also actively encouraged efforts to control noxious weeds and efforts to close roads to improve elk habitat effectiveness and harvest vulnerability.

Beginning in 1949, after a severe winter which killed 90% of the original bitterbrush stand, IDFG, in cooperation with the USFS and the Intermountain Forest and Range Experiment Station, began numerous re-vegetation attempts in the Sawtooth Zone (IDFG unpublished data). These bitterbrush plantings were attempted throughout the 1950s, 60s, and 70s, with patchy success. USFS also regularly conducts small-scale plantings of crested wheatgrass. At this time, it is unknown whether the plantings have had any effect on big game populations.

Historically, winter range in the Sawtooth Zone has been limited due to invasion of non-native weed species, erosion, and drought conditions. During harsh winters, IDFG conducts winter feeding in GMU 33 in efforts to prevent heavy winter mortalities that have been common in the past (Kuck 1999). Over the past 15 years, winter feeding occurred during only 2 winters (2001/2002 and 2007/2008).

Changes in Black Bear and Mountain Lion Hunting Seasons

Cause-specific mortality rates on elk ≥ 6 months of age suggest that mountain lion predation plays only a minor role in the decline of Sawtooth Zone elk populations; therefore, no changes to the lion harvest have been implemented. Additionally, the 2009-2012 mountain lion harvest in GMUs 33, 34, 35, and 36 was 47% lower than reported between 2005 and 2008 and represents a continued decline over the last decade (IDFG, unpublished data, 2012).

In response to livestock depredations in the late 1990s, the 2000 - 2010 Black Bear Management Plan established heavy harvest goals in the Sawtooth Zone. Accordingly, spring and fall black bear seasons in GMUs 34, 35 and 36 were extended to encourage higher harvest. Historically, January calf:cow ratios $\geq 30:100$ cows provided little indication that black bear predation on neonate elk calves was a driving factor. The recent rebound in January calf:cow ratios indicate that if black bear predation was impacting neonate elk calf survival it was temporary.

Wolf Hunting Seasons and Population Estimates

In 2008, IDFG established Wolf Management Zones to facilitate state monitoring and management. Wolf management zones were created by combining one or more Elk Management Zones with similarity in wolf population, prey base, and current or potential conflicts with livestock. In preparation for the first Idaho wolf hunt in 2009, IDFG set a statewide harvest limit and individual harvest limits by Wolf Zone. In subsequent seasons, the statewide harvest limit and some Wolf Zone limits were removed. The wolf harvest limit within the Sawtooth Wolf Zone was set at 60 in 2009, 2011, and 2012 seasons. There was no season during 2010 due to relisting under the Endangered Species Act.

The Sawtooth Wolf zone includes the Sawtooth (GMUs 33, 34, 35, and 36) and Boise River (GMU 39) Elk Zones (Figure 9). However, for the purposes of this predation management plan, only data pertinent to wolf populations residing in the Sawtooth Elk Zone will be presented. Population estimates, mortality, and harvests associated with wolves in the Boise River Elk Zone (GMU 39) are not presented.

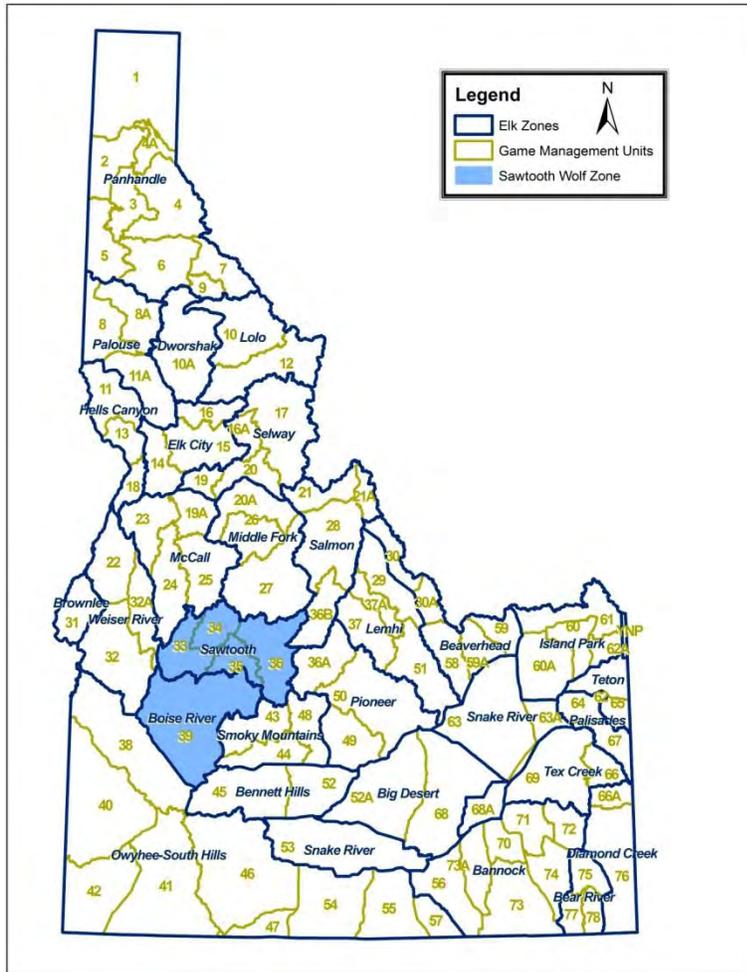


Figure 9. Sawtooth Wolf Management Zone includes Sawtooth and Boise River Elk Zones.

Wolf population estimates are determined using documented packs, mean pack size, number of wolves documented in small groups not considered packs, and a percentage of the population believed to be lone wolves. The formula is presented as:

$$\text{Wolf Population Estimate} = [(\# \text{ Wolves in documented packs with complete counts}) + (\# \text{ Documented packs lacking complete counts} * \text{mean pack size}) +$$

$$(\# \text{ Wolves in other documented groups} \geq 2)] * (\text{lone wolf factor of } 12.5\%)$$

$$\text{Example: } 2008 \text{ estimate} = [(83 + (1 * 8.3) + (5))] * 1.125 = 108.33$$

Table 5 describes wolf population estimates based on statewide averages and marked Sawtooth DAU wolves. Wolf mortality is based on known wolf deaths and does not include a percentage of other unknown deaths. Between 2008 and 2012, 42 wolves were taken through Wildlife

Services control action, 55 through regulated harvest and 32 through other means (natural causes, illegal take) in the Sawtooth Elk Zone (Table 5).

Table 5. Wolf mortality and population estimate within the Sawtooth Elk Zone (GMU 33, 34, 35, and 36) between 2008 and 2012.

Mortality Type	2008	2009	2010	2011	2012
Control	10	14	3	3	12
Harvest	0	18	10	11	16
Other	8	11	1	8	4
Total Known Mortality	17	43	14	22	32
Total Number Packs	10	11	11	12	12
Wolf Population Estimate	108	95	86	86	69

RISK ASSESSMENT

Predator Population

The reduction in predators will be limited to wolves based on the evidence presented. Wolf predation is a contributing factor influencing the survival of elk in the Sawtooth Elk Zone.

As of December 31, 2012 there was a minimum of 69 wolves in 12 packs in the Sawtooth Elk Zone area. Wolves outside of Units 33, 34, 35, and 36 will not be affected by actions authorized under this predator management plan.

Removal rates of 30-35% or less typically do not cause any long-term changes in wolf abundance, while removals of 40% or more may cause long-term reductions (Gasaway et al. 1983, Keith 1983, Peterson et al. 1984, Peterson and Page 1988). However, wolf populations have sustained human-caused mortality rates of 30 to 50% without experiencing declines in abundance (Fuller et al. 2003). Gasaway et al. (1983) found wolf abundance was unchanged with 16-24% harvest, but declined 20-25% after harvests of 42-61%. Based on mean pack size of 8, mean litter size of 5, and 38% pups in packs, Boertje and Stephenson (1992) suggested 42% of juveniles and 36% of adults must be removed annually to achieve population stability. In their analysis of multiple data sets, Adams et al. (2008) found human caused mortality rates $\leq 29\%$ did not cause wolf population declines. Wolf populations tend to compensate for low removal rates and return to pre-removal levels rapidly, potentially within a year. It is hypothesized that compensatory mechanisms include increased survival, immigration, and possibly increased fecundity (Seal et al. 1975), Van Ballenberghe and Mech 1975, Fuller 1989). However, Adams et al. (2008) found compensatory survival and fecundity shifts were of insufficient magnitude to influence demographics, and that shifts in immigration and emigration rates served as the primary compensatory mechanisms. Therefore, under the Idaho scenario with

surrounding populations of wolves being under the similar heavy harvest objectives, increase of the population would be expected to be based more on compensatory survival and fecundity shifts as opposed to high levels of immigration. Immigration would be reduced though not eliminated, and populations would be expected to increase in a short time if hunting were to be curtailed or stopped.

Prey Populations

Elk will be the primary species benefitting from the proposed actions in this plan. Other prey species may benefit such as mule deer.

Hunting and Wildlife Associated Recreation Opportunity

The Department has substantially reduced elk hunting opportunity in the Sawtooth Elk Zone since 2008. Implementation of actions designed to reduce the impacts of predation on elk may result in a subsequent increase in opportunities for sportsmen and for other wildlife-associated recreationists whose focus is elk. Harvest and viewing opportunities will continue for bear, lions, and wolves under the actions of this plan.

PROGRAM

Boundaries

Efforts to reduce the number of wolves addressed in this predation plan will be focused on those wolf packs that are located in the Sawtooth Elk Zone (GMUs 33, 34, 35, and 36) in the winter (see Figure 1).

Current Status

The most recent population survey for elk in the Sawtooth Zone was conducted in 2013 and showed a slight increase in the elk population compared to 2009. Bull numbers and number of calves increased 22% and 45% respectively. However, overall cow numbers dropped 22%. Cow survival between 2010 and 2012 averaged 87% indicating that survival has been stable. Estimated calf recruitment went from $\leq 12:100$ in 2008 and 2009 to $\geq 19:100$ in 2010 and 2011 indicating a potential for population stabilization and eventual growth.

Proposed Actions

IDFG's actions are currently focused on wolf reduction since elk survival studies in the Sawtooths indicate this is the primary limiting factor. Sport harvest is the Department's preferred tool for reducing wolves in the Sawtooth Zone. Actions proposed in this plan start

with regulated harvest and outcomes will be monitored to determine if elk populations stabilize and then increase. If the desired elk population objectives cannot be achieved through regulated harvest then other actions beyond sport harvest will be considered.

In addition, control actions authorized by IDFG have also been used to reduce wolf numbers and/or eliminate whole wolf packs when wolves have been implicated in livestock depredations. Control actions in response to livestock depredations will continue to be used as needed. Other tools that may be considered include extended hunting seasons, allowing trappers to trap in portions of the Zone (GMUs 34 and 35) during winter, and hiring professional trappers to target wolves in high wolf-use areas during winter.

Wolf populations will be reduced by a minimum of 40% of the highest population reached in 2008 and maintained at that level for 3 years to monitor the results of the reduction. The 2008 wolf population estimate in the Sawtooth Elk Zone was 108. A 40% reduction equates to maintaining no more than 65 wolves by March 31 in GMUs 33, 34, 35, and 36. By the end of 2012 (December 31), the wolf population in the Sawtooth Elk Zone was approximately 65 wolves.

Regulated Sport Harvest

Currently, regulated sport harvest consists of a wolf hunting season that runs from 30 August through 31 March. During the 2009, 2011, and 2012 wolf hunting season's hunters legally harvested 34, 20, and 19 wolves, respectively, within the Sawtooth Elk Zone. A harvest limit of 60 wolves was established for the wolf management zone, which includes Unit 39. Because of the high human-use and possible negative effects for pet owners, regulated trapping seasons will not be encouraged under this management plan within most of the Sawtooth Elk Zone.

If wolf populations cannot be maintained with current harvest structure and elk populations decline (determined by low calf:cow ratios, sightability surveys, and survival of radio-collared 6-month old calves and cow elk), additional tools may be implemented to retain wolf and elk population objectives.

Regulated Sport Harvest Tools to Consider:

1. Allow limited regulated trapping during winter in portions of the Sawtooth Zone away from heavy recreational use areas.
2. Extend hunting/trapping seasons to June 30.
3. Eliminate wolf harvest limit for the zone.
4. Offer depredation hunts in areas with chronic livestock depredation problems.
5. Increase number of hunting tags that can be used per individual in the Sawtooth Zone.

Other Actions

After reducing the wolf population by 40% and maintaining lower wolf densities, if elk populations continue to decline under regulated wolf harvest, then other actions will be implemented.

Other Action Tools to Consider:

1. Hire USDA Wildlife Services and/or other professional trappers to trap wolves during winter.
2. Contract with USDA Wildlife Services to allow aerial removal of wolves on elk winter range.

Objective and Measures of Success

The objective of this Predation Management Plan is to affect an increase in elk numbers in the Sawtooth Elk zone to move these populations toward stabilization and eventual recovery by reducing predator populations. Success will be measured by comparing elk status with IDFG elk population objectives.

MONITORING

Elk

Progress toward the elk plan objectives will be evaluated by monitoring:

- Changes in elk population estimates using the sightability survey approach (Unsworth et al. 1994); timing of future surveys will follow IDFG's big game survey schedule.
- Annual herd composition obtained during mid-winter
- Survival estimates of 6-month old calves and cows using radio-collaring; estimates will be used with herd composition ratios to determine end of the year recruitment rates
- Additional monitoring may include radio-collaring of neonates if mid-winter composition ratios decline below 30 calves:100 cows

Harvest of bears, mountain lions and wolves will be monitored through the standard process of completion of Big Game Mortality Report Forms by each successful hunter. These forms provide detailed information for each individual animal harvested and are accompanied by extraction of a tooth for aging and attachment of an identification tag to each pelt.

Wolves

The number of wolves will be determined from observation and enumeration of packs with radio collars, observations of unmarked packs, and observations of individual wolves during wolf tracking surveys or during removal efforts. Wolf abundance estimates will be determined annually throughout the predation management action. Wolves determined to be in the Sawtooth Wolf Zone may include any pack members or transients that occur within Units 33, 34, 35, and 36 at any time.

Monitoring efforts in the Sawtooth Zone have been very thorough during the past 5 years because of the wolf monitoring team efforts, research efforts, and work conducted by University of Montana graduate students. As those efforts wrap up and funding for wolves begins to diminish, it will be more difficult to continue high level monitoring. However, some of the tools developed may be used to continue monitoring efforts. Surveying historic and predicted rendezvous sites (Ausband et al. 2010), conducting howl box surveys to verify presence/absence (Ausband et al. 2011), using trail cameras to verify production, and linking harvest data to specific packs may be used in absence of radio-collared animals.

Budget

Most funds required to implement monitoring in this plan are available as part of larger, ongoing IDFG programs. Aerial surveys to estimate zone-level elk population estimates are funded through statewide ungulate monitoring budgets. Funds to conduct annual composition and obtain survival rates may partly be available from annual Regional budget but additional funding may need to be identified. Funding to monitor wolves has been from federal wolf appropriations but this funding is declining. Funds in the future are likely to be a combination Pittman-Robertson funds and IDFG license dollars. Additional funds will be determined as necessary.

LITERATURE CITED

- Adams, L. G., R. O. Stephenson, B. W. Dale, R. T. Ahgook, and D. J. Demma. 2008. Population dynamics and harvest characteristics of wolves in the central Brooks Range, Alaska. *Wildlife Monographs* 170:1–25.
- Ausband, D.E., J. Skrivseth, and M. S. Mitchell. 2011. An automated device for provoking and capturing wildlife calls. *Wildlife Society Bulletin* 35:498-503.
- Ausband, D. E., M. S. Mitchell, K. Doherty, P. Zager, C. M. Mack, and J. Holyan. 2010. Surveying predicted rendezvous sites to monitor gray wolf populations. *Journal of Wildlife Management* 74:1043-1049.
- Boertje, R. D., and R. O. Stephenson. 1992. Effects of ungulate availability on wolf reproductive potential in Alaska. *Canadian Journal of Zoology* 70: 2441–2443.
- Boutin, S. 1992. Predation and moose populations: A critique. *Journal of Wildlife Management* 56:116-127.
- Boyd, D. K. 1994. Prey taken by colonizing wolves and hunters in the Glacier National Park area. *Journal of Wildlife Management* 58:289-295.
- Carbyn, L. N. 1983. Wolf predation on elk in Riding Mountain National Park, Manitoba. *Journal of Wildlife Management* 47:963-976.
- Cook, J. G., L. J. Quinlan, L. L. Irwin, L. D. Bryant, R. A. Riggs, J. W. Thomas. 1996. Nutrition-growth relations of elk calves during late summer and fall. *Journal of Wildlife Management*. 60:528-541.
- Cook, J. G. 2002. Nutrition and food. Pages. 259–250. *in* D. E. Toweill, and J. W. Thomas, editors. *North American elk: ecology and management*. Smithsonian Institution Press, Washington, D.C., USA.
- Cook, J. G., B. K. Johnson, R. C. Cook, R. A. Riggs, T. Delcurto, L. D. Byrant, and L. L. Irwin. 2004. Effects of summer-autumn nutrition and parturition date on reproduction and survival of elk. *Wildlife Monographs* 155.
- Eberhardt, L.L. 1985. Assessing the dynamics of wild populations. *Journal of Wildlife Management* 49:997-1012.
- Freddy, D. J. 1987. The White River elk herd: a perspective, 1960-85. Technical Publication No. 37, Colorado Division of Wildlife, Fort Collins, USA.
- Fuller, T. K. and D. L. Murray. 1998. Biological and logistical explanations in variation in wolf

- population density. *Animal Conservation* 1:153-157.
- Fuller, T. K., L. D. Mech, and J. F. Cochrane. 2003. Wolf population dynamics. Pp. 161–191 in *Wolves: behavior, ecology, and conservation* (L. D. Mech and L. Boitani, eds.). University of Chicago Press, Chicago, Illinois.
- Gaillard, J. M., M. Festa-Bianchett, and N. G. Yoccoz. 1998. Population dynamics of large herbivores: variable recruitment with constant adult survival. *Trends in Ecology and Evolution* 13:58-63.
- Gassaway, W. C., R. O. Stephenson, J. L. Davis, P. E. Shepherd, and O. E. Burris. 1983. Interrelationships of wolves, prey, and man in interior Alaska. *Wildlife Monographs* 84.
- Hamlin, S. J. Riley, D. Pyrah, A. R. Dood, and R. J. Mackie. 1984. Relationships among mule deer fawn mortality, coyotes, and alternate prey species during summer. *Journal of Wildlife Management* 48:489-499
- Heisey, D. M. and B. R. Patterson. 2006. A review of methods to estimate cause-specific mortality in presence of competing risks. *Journal of Wildlife Management* 70: 1544-1555.
- Husseman, D. L. Murray, G. Power, C. Mack, C. R. Wegner, and H. Quigley. 2003. Assessing differential prey selection patterns between two sympatric large carnivores. *Oikos* 101:591-601.
- Idaho Department of Fish and Game. 2000. Policy for avian and mammalian predation management. 4pp.
- Idaho Legislative Wolf Oversight Committee (ILWOC). 2002. Idaho Wolf Conservation and Management Plan. 32pp.
- Idaho Department Fish and Game. 2011. Effects of wolf predation on elk populations. PR11 S11 9-13. Boise, ID
- Idaho Department of Fish and Game. 2011. PR report Mountain Lion Surveys and Inventories. Job W-170-R-35 3 – I – 8.
- Idaho Department of Fish and Game. 2011. Predation Management Plan for the Lolo and Selway Elk Zones. 17pp.
- Idaho Department of Fish and Game. 2012. Big Game Mortality Database, Lion Harvest.
- Kuck, L. J. 1999. Idaho elk management plan: Status and objectives of Idaho's elk resources. 110pp.
- Kunkel, K. E., and D. H. Pletscher. 1999. Species-specific population dynamics of cervids in a multipredator ecosystem. *Journal of Wildlife Management* 63:1082-1093.

- Kunkel, K.E., T. K. Ruth, D. H. Pletscher, and M. G. Hornocker. 1999. Winter prey selection by wolves and cougars in and near Glacier National Park, Montana. *Journal of Wildlife Management* 63:901-910.
- Leptich, D. J., and P. Zager. 1991. Road access management effects on elk mortality and population dynamics. Pages 126-131 *in* A. G. Christensen, L. J. Lyon, and T. N. Lonner, compilers, *Proceedings of a Symposium on Elk Vulnerability*, Montana State University, Bozeman, USA.
- McCorquodale, S. M., R. Wiseman, and C. L. Marcum. 2003. Survival and harvest vulnerability of elk in the Cascade Range of Washington. *Journal of Wildlife Management* 67:248-257.
- McCullough, D. R. 1979. *The George Reserve deer herd: population ecology of a K-selected species*. The University of Michigan Press, Ann Arbor, USA.
- Murphy, K. M., M. S. Nadeau, and T. K. Ruth. 2011. Cougar-prey relationships. Pages 41-70 *in* J. A. Jenks, editor. *Managing cougars in North America*. Jack H. Berryman Institute, Utah State University, Logan, Utah. USA.
- Pauley, G. R., and P. Zager. 2011. Study II: effects of wolf predation on elk populations. Pages 38–47 *in* B. B. Compton, compiler and editor. *Project W-160-R-37, Progress Report*. Idaho Department of Fish and Game, Boise, USA.
- Peterson R. O, Woolington J. D, and T. N. Bailey. 1984. *Wolves of the Kenai Peninsula, Alaska*. Wildlife Monographs 88.
- Peterson, R.O. and R. E. Page. 1988. The rise and fall of Isle Royale wolves, 1975–1986. *Journal of Mammalogy*, 69, 89–99.
- Pollock, K. H., S. R. Winterstein, C. M. Bunck, and P. D. Curtis. 1989. Survival analysis in telemetry studies: the staggered entry design. *Journal of Wildlife Management* 53:7-15.
- Raithel, J. D. 2005. *Impact of Calf Survival on Elk Population Dynamics in West-Central Montana*. University of Montana, Missoula, Montana, USA.
- Seal, U.S., L.D. Mech, and V. VanBallenberghe. 1975. Blood analyses of wolf pups and their ecological and metabolic interpretation. *Journal of Mammalogy* 56:64-75.
- Smith, D. W., Drummer, T. D., Murphy, K. M., Guernsey, D. S. and S. B. Evans. 2004. Winter prey selection and estimation of wolf kill rates in Yellowstone national park, 1995–2000. *Journal of Wildlife Management*, 68, 153–166.

- Unsworth, J. W., L. Kuck, M. D. Scott, and E. O. Garton. 1993. Elk mortality in the Clearwater drainage of north-central Idaho. *Journal of Wildlife Management* 57:495-502.
- Unsworth, J. W., F. A. Leban, D. J. Leptich, E. O. Garton, and P. Zager. 1994. *Aerial Survey: User's Manual*. Second edition. Idaho Department of Fish and Game, Boise, USA.
- Van Ballenberghe and Mech. 1975. Weights, growth and survival of timber wolf pups in Minnesota. *Journal of Mammalogy*.
- White, G. C. 1985. Survival rates of wapiti (*Cervus elaphus nelsoni*) in the Jemez Mountains, New Mexico, USA. *The Royal Society of New Zealand* 22:51-54.
- White, P. J. and R. A. Garrott. 2005. Yellowstone's ungulates after wolves – expectations, realizations, and predictions. *Biological Conservation* 125, 141–152.
- White, C. W, P. Zager, and M. W. Gratson. 2010. Influence of predator harvest, biological factors and landscape on elk calf survival in Idaho. *Journal of Wildlife Management* 74:355-369. White, C. W. 2011. Progress Report. Mountain Lion. Idaho Department of Fish and Game, Boise, Idaho.
- Wright, G. J., R. O. Peterson, D. W. Smith, and T. O. Lemke. 2006. Selection of Northern Yellowstone elk by gray wolves and hunters. *Journal of Wildlife Management* 70:1070-1078.
- Zager, P., G. Pauley, M. Hurley, and C. White. 2007. Statewide elk ecology. Progress Report, Project W-160-R-33. Idaho Department of Fish and Game, Boise.

APPENDIX A

Policy for Avian and Mammalian Predation Management.

ADOPTED AUGUST 24, 2000

I. PURPOSE

The Idaho Department of Fish and Game (Department) has a responsibility to preserve, protect, perpetuate and manage all wildlife in the state and to provide continued supplies of such wildlife for hunting, fishing and trapping. To fulfill its responsibility, the Department must efficiently and effectively manage populations of predators as well as populations of prey species to meet management objectives. The Department recognizes predator management to be a viable and legitimate wildlife management tool that must be available to wildlife managers when needed. However, the Department also recognizes that predator removal is controversial both publicly and professionally. The purpose of this policy is to provide the Department direction in managing predator populations consistent with meeting management objectives for prey species populations.

This policy does not apply to emergency response situations where the Department must act to protect human health and safety.

II. DEFINITIONS

- A. "Predation" means the act of an individual animal killing another live animal.
- B. "Predator" means any wild animal species subsisting, wholly or in part, on other living animals captured through its own efforts. Predators are defined in Idaho Code as 'big game animals' (black bear and mountain lion), 'migratory birds' (American crow), 'fur-bearing animals' (badger, bobcat, fisher, marten, mink, otter, raccoon, and red fox), and 'predatory wildlife' (coyote, skunk, and weasel). For the purpose of this policy, "predator" will include primarily those avian and terrestrial species subject to Idaho jurisdiction, but may in some cases include species which are protected under the Migratory Bird Treaty Act or the Endangered Species Act. For predatory species protected under these or other federal statutes, the Department may cooperate with the USDA Animal and Plant Health Inspection Service and/or the U.S. Fish and Wildlife Service in addressing predation problems caused by such species.
- C. "Predation management" means the application of professional wildlife management technology to increase or decrease predator populations. Predator management may include management of habitats to benefit or depress populations, selective harvest of individual animals, or generalized harvest over a geographic area.

- D. "Predator removal" means the physical removal of an animal, alive or dead, from an area where its presence is undesirable. Physical removal of live animals for release in habitats already occupied by the same species has been shown to create additional problems as individual animals seek living space (i.e., a home range) within already-occupied suitable habitat; for that reason, predator removal will often but not necessarily require lethal methods.
- E. "Prey" means any animal hunted or killed as food by a predator.

III. **POLICY**

Predator populations, as with all wildlife in Idaho, will be managed to assure their future recreational, ecological, intrinsic, scientific, and educational values, and to limit conflicts with human enterprise and values. Where there is evidence that predation is a significant factor inhibiting the ability of a prey species to attain Department population management objectives and the Department decides to implement predation management actions, the 14 management actions will ordinarily be directed by a predation management plan.

Predator populations will be managed through habitat manipulation and/or predator removal as appropriate. Wildlife managers and administrators implementing predation management options will consider the ecological relationships that will be affected. Management decisions will be consistent with objectives or management plans for predators, animals that constitute or contribute to the predator's prey base, affected habitat, and other biological and social constraints.

Idaho Code provides that predatory wildlife (i.e., coyotes, jack rabbits, skunks, starlings, raccoons and weasels) may be taken by any legal means at any time.

On lands managed by the Department, efforts to limit the size of predator populations may include habitat manipulation. The Department may encourage other land management agencies to manipulate habitat under their jurisdiction in a manner to limit the size or effectiveness of predator populations.

The Department, when and where feasible, will rely on sportsmen (licensed hunters and trappers) to take predators classified as game animals and fur-bearing animals, and may alter seasons or harvest rules to meet wildlife management objectives. However, the Department will not support any contests or similar activities involving the taking of predators which may portray hunting in an unethical fashion, devalue the predator, and which may be offensive to the general public. The Department opposes use of bounties as a predator control measure. The Department will not implement a program based, in whole or in part, on utilizing methods involving sterilization or birth control in wild animals.

The Department will cooperate with the Animal and Plant Health Inspection Service (APHIS) Wildlife Services Program to address specific areas and species, particularly on private lands, in a manner consistent with the approved interagency Memorandum of Understanding.

The Director may implement a Predation Management Plan in those circumstances where wildlife management objectives for prey species cannot be accomplished within two years by habitat manipulation, sportsman harvest, or interagency action designed to benefit the prey species, and where there is evidence that action affecting predators may aid in meeting management objectives. Essential components of such a Predation Management Plan are defined below.

This policy does not affect existing predator management policies and procedures used to administer livestock depredation issues.

IV. PROCEDURES

Managers recognize the role of predators in an ecological and conservation context. Impacts of the removal of individual predators on the structure of the predator population, as well as the prey population, will be considered. The actions by the Department must be based on the best available scientific information, and will be evaluated in terms of risk management to all affected wildlife species and habitats. Valid concerns for human health and safety exist. Predator management will consider the need to avoid risk of human injury, loss of life, or potential for disease transmission.

Predator management may occur but is not limited to the following circumstances:

1. In localized areas where prey populations are fragmented or isolated, or where introductions or transplants of potentially vulnerable wildlife species (e.g., bighorn sheep, wild turkeys, sharp-tailed grouse, and others) has occurred or is imminent. Control may be intensive and of sufficient duration to allow transplanted animals and their progeny to become established and to become self-sustaining, or selective with removal efforts directed at specific offending animals.
2. In specific areas where managers are unable to meet management goals and objectives for prey populations due to predation. For example, in areas where survival or recruitment of game animal populations is chronically low and management plan objectives have not been or cannot be met and where there is evidence that predation is a significant factor, predator control may be initiated.
3. On wildlife management areas, especially those which are managed primarily to provide for production of specific species (e.g., waterfowl), provision of critical

winter range, and those acquired and managed to provide specific mitigation for wildlife losses elsewhere.

Predation Management Plans will consider options other than just predator removal. Various kinds of habitat manipulation can sometimes negate or minimize the effect of predators, including constructing nesting islands, providing cover plantings, or removal of roosts used by avian predators. Preventative actions are important in reducing conflicts with predators; therefore, the Department will seek ways to reduce the vulnerability of prey species to predation, and will cooperate with federal and state agencies, counties, and others to promote activities on public and private lands that will limit predator impacts. Such activities may include working with landowners and land managers to reduce winter concentrations of prey species (especially where artificially concentrated by food resources), and working with recreation managers to direct or reduce human activities that may increase the vulnerability of prey species to predators.

PREDATION MANAGEMENT PLANS

Predation management plans will be prepared using the following outline:

1. Definition of the problem. This definition must include a rationale for the proposed action. Such a rationale may include:
 - A. a proposed management action (such as the introduction of a small number of animals into suitable but unoccupied habitat) that may be adversely affected by the presence and predictable actions of predators,
 - B. a finding that approved wildlife management objectives are not being met due in large part to the actions of predators, or
 - C. evidence that wildlife recruitment or populations has been or will be adversely be impacted by the presence of predators.
2. Risk Assessment. A discussion of the ramifications of the program, including potential effects on:
 - A. predator populations (i.e., will removal of avian roosting trees near a waterfowl production area affect non-targeted species, such as bald eagles? Will removal of specific individual animals result in vacant home ranges that will be especially attractive to transient predators of the same species?)
 - B. prey or benefiting species,
 - C. sportsmen and wildlife-associated recreational opportunity,
 - D. landowners in or near the impacted area, and
 - E. groups that will strongly favor or oppose the proposed action.

3. Program. A discussion of the specific proposed treatment, including:
 - A. clearly-defined boundaries,
 - B. the species of predator(s) affected,
 - C. the prey or other species to benefit from any proposed action,
 - D. the method or techniques identified to address identified concerns, including habitat manipulation where appropriate and the method(s) of predator removal (if removal is a component of the program),
 - E. the objective and measure of success used to determine whether that objective has been achieved,
 - F. date of initiation of actions,
 - G. measurable objectives and monitoring plans to assess program effectiveness, and
 - H. budget.

All predator management plans will be reviewed by the chief of the Bureau of Wildlife and regional supervisor. Predator management plans must be approved by the director. Predator management plans will be reviewed and evaluated annually.

REVISION DATE: This policy shall be reviewed on or before June 30, 2005.

APPENDIX B

Sawtooth Zone wolf population estimates based on statewide pack size averages:

YEAR	# PACKS	# PACKS REMOVED	#WOLVES IN PACKS (COMPLETE COUNTS)	# PACKS USING COMPLETE COUNT	# PACKS USING MEAN PACK SIZE	MEAN PACK SIZE	# WOLVES IN OTHER DOC GROUPS	# WOLVES USING FORMULA
2008	10	1	83	9	1	8.3	3	106
2009	11	1	35	5	6	7.8	3	95
2010	11	0	37	6	5	7.1	3	85
2011	12	0	22	4	8	6.5	2	86
2012	12	1	26	6	6	5.5	2	69

Predator Control Actions May Occur

- In areas where game populations are fragmented or isolated, or where introductions or transplants of potentially vulnerable wildlife have occurred.
- In areas where evidence shows predation to be a significant factor in game populations not meeting management goals.
- In wildlife management areas, especially those managed primarily to provide for production of species, critical winter range, and areas acquired and managed to help mitigate for wildlife losses elsewhere.



Nonlethal Actions Usually Not Feasible

A variety of nonlethal predator controls have been tried, including capturing and relocating bears, mountain lions and wolves. Despite some successes, removing live animals for release in habitats already occupied by the same species often creates additional problems. These techniques are difficult and generally ineffective when predators are limiting game populations. Fish and Game considers the costs and potential benefits before starting any control action.

The Goal: Reduction Not Elimination

Predator control often involves removal of animals, but the intent is not to completely eliminate predators. The long-term goal is to reduce predator numbers enough to allow increased game numbers, increased harvest opportunities, and to maintain viable populations of all wildlife, including predators. Fish and Game does not support contests or bounties on predators, that portray hunting in an unethical light, devalue the predator and may be offensive to the public.

Controversy will always surround predation management. It is complex and involves balancing diverse interests using biological and social considerations. Left unmanaged, predators and prey are likely to cause private property damage and have significant economic impacts. Unmanaged wildlife populations can also result in increased disease transmission, declines in habitat, food sources, and reduction of hunting, fishing and trapping opportunities.

Want to know more?

For an example of a Predation Management Plan, visit <http://fishandgame.idaho.gov> Click on 'Wildlife', then 'Wildlife Plans', and scroll down to the link on 'Predation Management Plan for the Lolo and Selway Elk Zones.'

Predation management actions will be based on the best available scientific information. Predators will be managed to minimize adverse impacts on other wildlife populations, minimize conflicts, and to ensure Idahoans continue to have healthy game populations for hunting, fishing, trapping and viewing.

For information about Fish and Game scan this QR code:

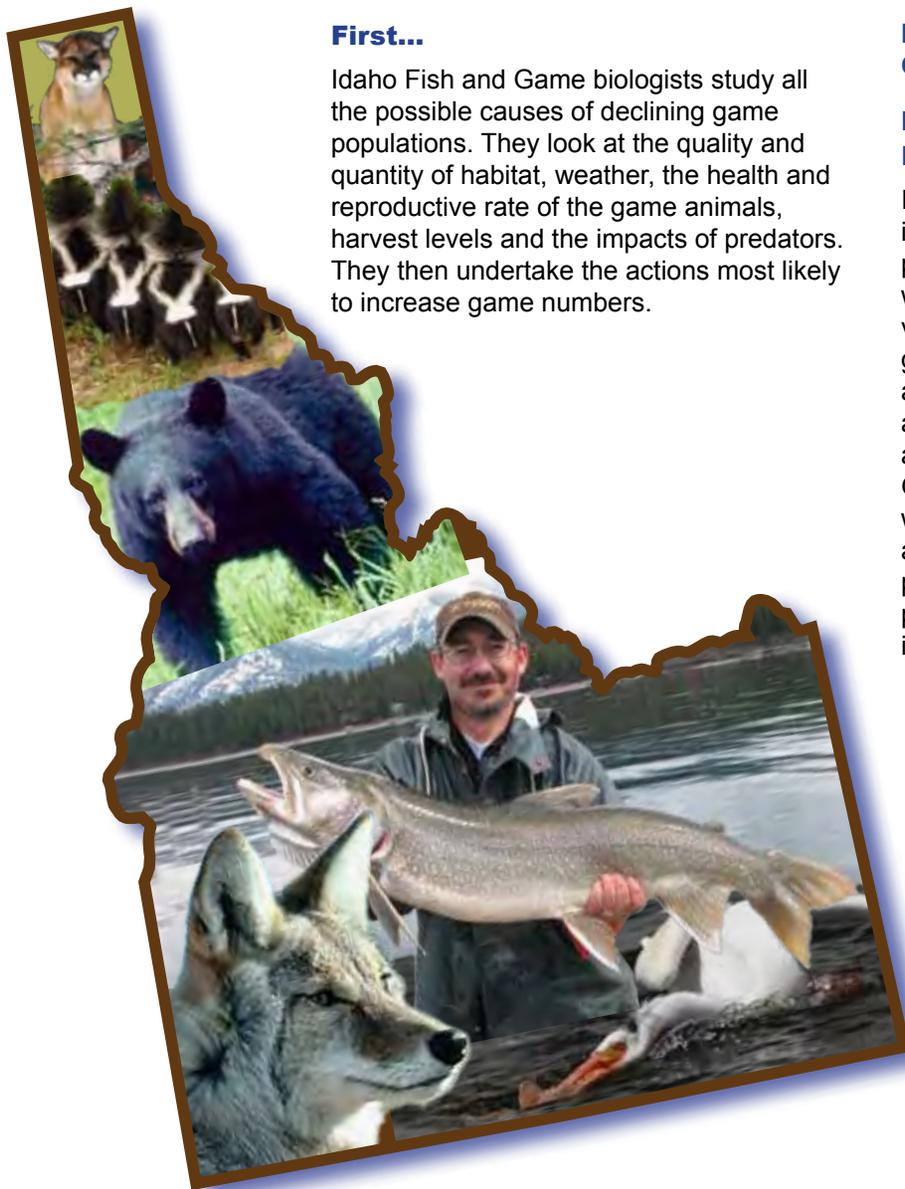


Understanding Predation Management in Idaho

To fulfill its statutory responsibility, Idaho Department of Fish and Game must efficiently and effectively manage all fish and wildlife, including predator species, to preserve, protect and perpetuate fish and wildlife for hunting, fishing and trapping.



When game populations drop below objectives and regulated harvest of predators is not adequate, a more aggressive approach, guided by a predation management plan is sometimes necessary.



First...

Idaho Fish and Game biologists study all the possible causes of declining game populations. They look at the quality and quantity of habitat, weather, the health and reproductive rate of the game animals, harvest levels and the impacts of predators. They then undertake the actions most likely to increase game numbers.

Management Options Include:

Habitat Improvement

In some cases, habitat improvement involves prescribed fire, noxious weed control and vegetative plantings to generate new growth and provide food and cover for game animals. Fish and Game also collaborates with federal and state agencies, counties and private landowners to promote similar habitat improvement activities.

Changes in Hunting Seasons

If hunting pressure is the cause of a population not meeting management goals, wildlife managers may alter seasons or impose harvest quotas. This includes managing hunters using OHV's during hunting season to improve habitat effectiveness and reduce harvest vulnerability.

Liberalize Trapping/Hunting Regulations

Hunting and trapping are important tools to manage predation. Where excess pressure from predators push the decline of game populations, managers offer longer seasons, higher bag limits, reduced tag prices or more opportunities to hunt or trap predators.

Then...

When there is evidence that predators are limiting game populations, a predator management plan is developed and implemented.

Different Strategies

A single management approach is unlikely to satisfy everyone. Fish and Game uses different strategies in different parts of the state to provide for different values, demands, and circumstances. Fish and Game uses regulated hunting, fishing and trapping when feasible to resolve predator conflicts with people or reduce their impacts on game populations. Some situations, however, call for more direct control methods.

Predation control actions are used when regulated hunting, fishing, or trapping is not enough to reduce predator populations to resolve conflicts with people or reduce impacts on game populations.

Long-term Wildlife Health

Fish and Game has a 75-year history of managing predator and game species. Populations of bears, mountain lions, wolves, mule and white-tailed deer, elk, moose, turkeys, and many other species are higher today than 75 years ago. The agency will continue to manage all Idaho's wildlife, with healthy populations, sustainable harvests and conservation as our guiding principles.